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No. 11-4B

STAFF OFFICERS FIELD MANUAL
NUCLEAR WEAPONS EMPLOYMENT EFFECTS DATA

TABLE OF CONTENTS

| | Chapter |
|---|----------|
| Foreword..... | |
| Contents, Data Sources and Applications..... | 1 |
| Weapon System Characteristics..... | 2 |
| Preinitiation..... | 3 |
| Coverage and Safety Tables - Low Air Burst - Exposed Personnel..... | 4 |
| Coverage and Safety Tables - Low Air Burst - Personnel in Open Foxholes..... | 5 |
| Coverage and Safety Tables - Low Air Burst - Personnel in Tanks..... | 6 |
| Coverage and Safety Tables - Low Air Burst - Moderate Damage to Materiel..... | 7 |
| Coverage and Safety Tables - Surface/Near Surface Burst - Exposed Personnel..... | 8 |
| Coverage and Safety Tables - Surface/Near Surface Burst - Personnel in Open Foxholes..... | 9 |
| Coverage and Safety Tables - Surface/Near Surface Burst - Personnel in Tanks..... | 10 |
| Coverage and Safety Tables - Surface/Near Surface Burst - Moderate Damage to Materiel..... | 11 |
| Atomic Demolition Munitions..... | 12 |
| Weapon Effects Tables..... | 13 |
| Collateral Damage Avoidance Tables..... | 14 |
| Graphs and Tables..... | 15 |
| | Appendix |
| References..... | A |
| Dual Fuzing Considerations..... | B |
| Blackout Effects of Nuclear Detonations on Radio Communications and Radar Transmission/Reception..... | C |
| Vulnerability of Army Tactical Equipment to EMP..... | D |
| Simplified Reference Data..... | E |

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CHAPTER 1

CONTENTS, DATA SOURCES AND APPLICATION

1-1. **PURPOSE.** This manual is designed to be used as a teaching vehicle to train target analysts when utilization of classified reference material is not feasible. The data presented are hypothetical and should be used only for training.

1-2. **CHAPTER 1 - GENERAL.** This chapter describes the various tables and graphs presented in the manual and provides the source of data used in the calculations. Descriptions of the content, composition and sources of information are intended to add clarity as well as to provide planning guidance to users of the manual.

a. **Weapon Terminology.** The weapon terminology has been changed to include a short name which describes the weapon's effects. The short name consists of two numbers separated by a dash. The first number is the casualty radius for Immediate Transient Incapacitation to personnel in tanks, in hundreds of meters, rounded to the nearest hundred. The second number is the safety radius for negligible risk to unwarned exposed personnel, in hundreds of meters, rounded to the nearest hundred. There is no buffer distance included in the safety radius. For systems with a casualty or safety radius which varies with range, 2/3 maximum range is selected. For example, consider the medium range cannon with the 2.0 KT yield. The casualty radius for Immediate Transient Incapacitation to personnel in tanks is 636 meters. The safety radius for negligible risk to unwarned exposed personnel is 3770 meters. The weapon can therefore be referred to as a (6-38).

b. **Units of Measurement.** The metric system of units is used throughout for distances and dimensions.

c. **Yields.** Hypothetical yields are used throughout the manual. The casualty yields used are expected values of yield. The safety yields utilized for safety and collateral damage calculations represent an upper limit on yield variation, and are assumed to be the casualty yields plus 10%.

d. **Casualty Yields.** Casualty yields in kilotons used in the tabulated computations are listed below.

| <u>Systems</u> | <u>Casualty Yields</u> | <u>Systems</u> | <u>Casualty Yields</u> |
|---------------------------|------------------------|----------------------|------------------------|
| Short Range Cannon (W10) | | Guided Missile (W30) | |
| Y-1 | 0.2 | Y-1 | 10.0 |
| Y-2 | 1.0 | Y-2 | 50.0 |
| | | Y-3 | 100.0 |
| Medium Range Cannon (W15) | | ADM (W40) | |
| Y-1 | 2.0 | Y-1 | 1.0 |
| Y-2 | 8.0 | Y-2 | 5.0 |
| Free Flight Rocket (W20) | | Bomb (B50) | |
| Y-1 | 5.0 | Y-1 | 3.0 |
| Y-2 | 20.0 | Y-2 | 10.0 |
| | | Y-3 | 100.0 |

e. **Accuracy.** The data presented for hypothetical system accuracy are the best estimates of total system accuracy, not solely round-to-round precision.

f. **Damage Definitions for Structures.**

(1) **Severe Damage:** That degree of structural damage that precludes further use of a structure for the purpose for which it is intended without essentially complete reconstruction. Generally, collapse of the structure is implied.

(2) **Moderate Damage:** That degree of structural damage to principal load-carrying members (trusses, columns, beams and load-carrying walls) that precludes effective use of a structure for the purpose for which it was intended until major repairs are made.

(3) **Light Damage:** That degree of damage that results in broken windows, slight damage to roofing and siding, blow down of light interior partitions and slight cracking of curtain walls in buildings. Generally, structures receiving light damage can be used as intended with only minor repairs and removal of debris.

g. **Damage Definitions for Materiel.**

(1) **Moderate Damage:** Damaged, nonfunctional, repairable with special tools, skills, and parts (at least half of all subsystems, for example, engine, power-train, tracks, etc., are not functional, but are repairable).

(2) **Severe Damage:** Damaged, nonfunctional, very difficult to repair (at least one subsystem is nonfunctional and not repairable except by replacement).

h. **Personnel Radiation Casualty Criteria.**

(1) **Immediate Permanent (IP) Incapacitation:** 8,000 rad -- Personnel will become incapacitated within 5 minutes of exposure, and for physically demanding tasks they will remain incapacitated until death. Death will occur in 1-2 days. (For tasks which are not physically demanding, immediate permanent incapacitation will occur at 18,000 rad. At this radiation level, death will occur within 1 day.)

(2) **Immediate Transient (IT) Incapacitation:** 3,000 rad -- Personnel will become incapacitated within 5 minutes of exposure and will remain so for 30-45 minutes. Personnel will then partially recover but will be functionally impaired until death. Death will occur in 4-6 days.

(3) **Latent Lethality (LL):** 650 rad -- Personnel will become functionally impaired within 2 hours of exposure. Personnel may respond to medical treatment and survive this dose; however, the majority of exposed personnel will remain functionally impaired until death in several weeks.

i. **Casualty and Damage Assessment.** When assessing casualties or damage, the Coverage Tables consider only blast and nuclear radiation effects. (Thermal casualties are not included in the coverage tables because of the large variability of target response due to target element posture.) The effect having the larger radius for damage or casualties is listed. Thermal casualties are included in the Effects Tables.

j. Safety Distance Assessment. Blast, thermal radiation and nuclear radiation were considered for assessing safety distances, and the largest radius of safety was listed. The atomic demolition munitions (ADM) also consider base surge and ejecta missiles.

k. Primary Targets.

- (1) Exposed Personnel. Unless otherwise stated, this term refers to personnel in the open, regardless of physical posture or uniform.
- (2) Personnel in Foxholes. This term refers to personnel in 1.8 meters deep open foxholes with a 0.3 meter firing step. Nuclear radiation radii were computed using foxhole transmission factors.
- (3) Personnel in Tanks. Severe damage to tanks was used to find blast radii for casualties to personnel in tanks. Nuclear radiation radii were computed using transmission factors for medium tanks. The larger of the two radii was selected for tabulation.
- (4) Moderate Damage to Wheeled Vehicles. The term, wheeled vehicles, refers to 2 1/2 ton trucks and 1/4 ton vehicles other than WWII jeeps. Blast only was considered.
- (5) Moderate Damage to Tanks. Data apply to light and medium tanks.
- (6) Moderate Damage to Towed Artillery. Refers to light, towed artillery. Damage to heavier and self-propelled artillery can be equated to moderate damage to tanks.

1-3. CHAPTER 2 -- HYPOTHETICAL WEAPON SYSTEMS CHARACTERISTICS. This chapter provides information concerning all nuclear weapons likely to be employed on the battlefield and delivery systems, except ADM, to include yields available, fuzing considerations, employment considerations, and reaction times. The characteristics of ADM are contained in Chapter 12.

1-4. CHAPTER 3 -- PREINITIATION. This chapter gives a brief explanation of preinitiation considerations. Data are provided to assist the analyst in scheduling nuclear fires.

1-5. CHAPTERS 4-7 -- TARGET TABLES FOR LOW AIRBURSTS. These chapters consist of four types of tables for each weapon system and primary target category.

a. Coverage Tables. The three tables per weapon present the precomputed effectiveness of all tactical weapons in the form of two coverage indices. The probable minimum radius of damage, the expected radius of damage, the system accuracy data, and the low air height of burst data are also provided. For personnel, there are three casualty criteria for each weapon: Immediate Permanent Incapacitation, Immediate Transient Incapacitation, and Latent Lethality. (These criteria are defined in paragraph 1-2h.)

(1) The coverage indices are two-part numbers describing the fractions of damage to accurately located [i.e., target location error (TLE) = 0] circular area targets having uniformly distributed elements. The first decimal represents the minimum fraction of damage that will occur with a high assurance considering both horizontal and vertical delivery errors. The second decimal represents the expected fractional damage. The two significant digits in the indices are not intended to imply certitude in the precision; rather, they ensure compatibility with the other target analysis techniques.

(2) The heights of burst (HOB) tabulated in the coverage tables for weapon systems with field selectable HOB, are the greater of the fallout safe (99% assurance) HOB or the optimum HOB for the effect and target considered. For weapon systems with fixed HOB, the preset HOB is used in calculations. For yields less than 100 KT, the fallout safe HOB is computed as $30(W)^{1/3}$ meters, plus 3.5 probable errors in height. For yields greater than 100 KT, the fallout safe HOB is computed as $55(W)^{1/3}$ meters, plus 3.5 probable errors in height.

(3) Vertical dispersion is the only parameter considered in computing the probable minimum radius of damage. There is a high assurance of equaling or exceeding the probable minimum radius of damage.

(4) The expected radius of damage is the mathematical expectation, i.e., weighted mean radius.

(5) Accuracy data are provided for use with the visual and numerical target analysis methods and secondary target types.

b. Safety Distance Tables. These tables list data pertaining to troop safety, preclusion of damage, and preclusion of obstacle creation.

(1) The data for troop safety are the minimum safe distances (MSD), consisting of radii of safety plus buffer distances for very high assurance (99%) of not exceeding the specified criterion. The radii of safety alone, without buffer distances, are listed in the Effects Tables, Chapter 13, and are based on criteria in FM 101-31-1. These radii of safety can be refined by considering vertical dispersion errors. See Chapter 5, para. 5-IV-5, FM 101-31-1 for details on this procedure. Buffer distances added to the radius of safety in general equal 3.5 times the larger of the respective probable errors in range (PER) and probable errors in deflection (PED). For range independent systems, the buffer distances are equal to twice the system CEP. Buffer distances preclude the necessity of applying corrections for troop dispositions relative to the line of fire.

(2) Risk Criteria.

- (a) Negligible Risk - Largest radius corresponding to 1% casualties or 2 1/2% nuisance effects.
- (b) Moderate Risk - Largest radius corresponding to 2 1/2% casualties or 5% nuisance effects.
- (c) Emergency Risk - 5% casualties (nuisance effects not specified).

(3) Nuclear Radiation Safety.

- (a) Negligible risk - 50 rad for previously unexposed troops.
- (b) Moderate risk - 70 rad for previously unexposed troops.
- (c) Emergency risk - 150 rad for previously unexposed troops.

(4) Blast and thermal safety levels vary with weapon yield.

(5) The data for preclusion of damage are based on a buffer distance for high assurance (90%). The following information is provided:

(a) Fixed bridges, moderate damage. The bridge considered is the most vulnerable type likely to be encountered.

(b) Buildings, light damage. This refers to all types of buildings with residence-type windows, doors, roofs and walls. Buildings without windows or buildings especially built to withstand high overpressures and dynamic pressures or earthquakes do not fall into this category.

(c) Light aircraft in flight. Aircraft are grouped into three hardness categories. Helicopters considered are attack AH-1G (referred to as assault in tables), observation OH-6A, and OH-58, utility UH-1D/H and cargo CH-47 and CH-54A. Data are not available for USMC aircraft. The fixed wing aircraft is the observation OV-1B, but the data can be applied to any in the OV-1 and OV-10 series. Least separation distance (LSD) is the distance from the burst that aircraft must be to avoid significant degradation of the airframe or pilot performance severe enough to prevent mission accomplishment. Effects of blast, nuclear radiation, and thermal radiation were considered. When preclusion of damage to light aircraft in flight is desired, it is essential that the target analyst be aware that the radii listed are those at which neither the aircraft nor the pilot receives sufficient effects to abort the mission. It does not mean that the pilot will not receive a nuclear radiation dose of 150 rads or more. An approximation of the dose the pilot will receive can be determined from the safety radii for unwarned exposed personnel columns in the Effects Tables of Chapter 13.

(6) The data for preclusion of damage or LSD include a buffer distance for high assurance (90%). The following information is provided.

(a) Severe damage by blowdown to foliated deciduous trees.

(b) Severe damage by blowdown of coniferous trees.

(c) Fires at 50% relative humidity in Class I thin wildland kindling fuels.

(d) Fires at 50% relative humidity in Class IV thin wildland kindling fuels. Descriptions of each class of fuel are listed below in increasing difficulty of ignition:

| <u>CLASS</u> | <u>DESCRIPTION</u> |
|--------------|--|
| I | Broadleaf and coniferous litter -- mixture of fine grass, broken leaves and duff, and thin translucent broadleaf leaves. |
| II | Hardwood and softwood punk in various stages of decay. |
| III | Cured or dead grass. |
| IV | Conifer needles and thick, nearly opaque, broadleaf leaves. |

Radii for the two extreme cases were computed and entered in this manual.

1-6. CHAPTERS 8-11 -- TARGET TABLES FOR SURFACE BURSTS. These chapters contain abbreviated information similar to that in Chapters 4 to 7. Source for crater dimensions below is Reference 3.

a. Crater Dimensions for Surface Bursts. Crater size is dependent upon yield. For a 1 KT burst on the surface, the crater dimensions are as follows:

| | <u>Dry Soil</u> | <u>Wet Soil</u> | <u>Dry Rock</u> | <u>Wet Rock</u> |
|--------|-----------------|-----------------|-----------------|-----------------|
| Radius | 19m | 25m | 15m | 18m |
| Depth | 9m | 9m | 7m | 9m |

For determining crater dimensions for surface bursts of yields other than 1 KT, the following equations apply.

$$\begin{array}{l} \text{Radius of Crater} \\ R_W = W_2^{1/3} R_1 \end{array} \qquad \begin{array}{l} \text{Depth of Crater} \\ H_W = W_2^{1/3} H_1 \end{array}$$

Where R_1 = Radius (in meters) of crater produced by 1 KT surface burst.

R_W = Radius (in meters) of crater produced by desired yield.

H_1 = Depth (in meters) of crater produced by 1 KT surface burst.

H_W = Depth (in meters) of crater produced by desired yield.

W_2 = Desired yield in KT.

b. Craters can be used as obstacles to enemy vehicles and equipment. The effective obstacle diameter can be obtained by multiplying the crater radius by 2.3.

1-7. CHAPTER 12 - ATOMIC DEMOLITION MUNITIONS (ADM). This chapter contains data on characteristics, reaction times, safe separation distances, and damage/casualty/safety radii tables associated with ADM.

a. Tunnel Demolition Tables were extracted from curves in Reference 3. The munition must be stemmed or tamped with at least 1 meter of sandbags, soil or water. Reliable data for severe damage to 30 meters of tunnel are not available for burst to tunnel distances (BTD) of less than 10 meters. (Burst to tunnel distance is shown on page 12-6.)

b. The bridge and pier data were obtained from Reference 3.

c. Safety radii involved consideration of five effects: blast, nuclear radiation, thermal radiation, base surge, and ejecta missiles. Only the governing radii of safety were entered in the manual.

d. Dose-distance data aid emplacement personnel in determining how much nuclear radiation is received from each exposure so that over-exposure from cumulative dosage can be avoided. An accurate and careful exposure history must be maintained for every individual who receives radiation.

e. Ejecta missile data were obtained from Reference 6. Sizes of missiles considered were 1 pound and larger.

f. Safety distance tables for light aircraft in flight include no buffer distances. Effects of nuclear radiation, thermal radiation, and blast on pilot and aircraft were considered.

g. The tree blowdown table provides distances from GZ where forests sustain moderate to severe damage.

h. The data for the crater dimension tables were extracted from cratering curves in Reference 3. Apparent crater diameters can be multiplied by 1.15 to determine obstacle size, as discussed in para. 1-6.

i. Radii of fire areas include wildland fuels and urban buildings. The data on urban buildings were taken from Reference 8.

1-8. CHAPTER 13 - WEAPON EFFECTS TABLES. This chapter contains a table for each weapon system, showing radii for casualties, damage, and safety for specific target types as a function of height of burst. The preset HOB or, in the case of range dependent systems, the computed HOB, was used. For preset fuzes, the outer pair of the seven HOB allows calculation of 99% assurance. The second and sixth HOB are 2 1/2 probable errors in height (PEH) above and below the desired HOB. These two HOB constitute the 90% vertical bracket. The third and fifth HOB are 1 PEH above and below the desired HOB. The one PEH approximates the expected vertical miss distance and should be used to obtain the radius of the RD circle used for calculating expected coverage. These two HOB constitute the 50% vertical bracket. If a weapon system has a contact option or backup fuze, the surface burst radii are provided. If a weapon system has more than one preset airburst HOB (low and high), a set of seven HOB, as described above, is listed for each preset HOB.

a. Personnel in any protected environment (except foxholes) are considered casualties when the environment receives severe blast damage. (For personnel in foxholes, only the weapon effects which directly affect the personnel are considered.) Radii of other effects were computed and only the radius of the governing effect was recorded. Earth shelters refer to any type of shelter where personnel are protected by at least one meter of earth and overhead cover.

b. Fixed bridges are two and four lane highway bridges and double track railroad girder bridges with spans of 61 meters or more. "Fixed bridges," as used here, are relatively resistant to blast in comparison to other types of bridges.

c. Radii of second degree burns to personnel in summer and winter uniforms were computed as a casualty-producing effect.

d. Preclude moderate damage radii and personnel risk distances are included. Such radii and distances were calculated using safety yields. The preclude moderate damage radii are for 50% incidence. The personnel risks are defined in FM 101-31-1. Vertical dispersion must be considered and buffer distances must be added to associate assurance with these numbers.

e. Railroad tank and flat cars were assumed to be loaded and randomly oriented.

f. Factories considered were one-story industrial buildings with steel frames, concrete or brick walls, windows, and with 25-50 ton capacity interior cranes.

g. Revetted (RVTTD) surface-to-air missiles are assumed to be in a U-shaped, man-made structure. The missiles are assumed to be in a horizontal position on their transporters with the top of the revetment extending slightly above the missile.

h. Severe Damage to Supply Depots. Supply depots are assumed to contain petroleum, oil and lubricants (POL) in 5 and 55 gallon drums; ammunition and rations in standard packages; and other items in small containers. Blast effects only are considered. Ruptured packages serve as evidence of severe damage to supply depots.

i. The exposed (EXPO) and shielded (SHLD) categories for wheeled vehicles and tracked equipment are defined as follows. Exposed equipment is subject to the dynamic pressures from the blast wave without reduction (assumed to be on a flat plane). Shielded equipment is subject to overpressures only (shielding is assumed to reduce dynamic pressures to a nonsignificant level).

1-9. CHAPTER 14 - COLLATERAL DAMAGE AVOIDANCE TABLES. This chapter contains a table for each weapon system, based on a 5% incidence of the effects shown (except thermal ignition where an incidence level cannot be predicted). The preset HOB are listed for each weapon system, or in the case of field selectable HOB, an HOB continuum is shown. For the systems with preset HOB, a total of seven HOB are tabulated for each preset HOB. These HOB are similar to those in the Effects Tables (see para. 1-8). If a weapon system has a contact option or contact backup option, surface burst radii of collateral damage avoidance are also listed. Troop safety yields were used in performing the calculations. Horizontal and vertical accuracy (buffer distances) are not included in the tabulated data and should be added commensurate with the commander's guidance. Personnel injury normally governs collateral damage constraints.

a. Personnel Injury. The radii listed for personnel injuries represent a 5% incidence of injuries requiring hospitalization. An injury requiring hospitalization for a civilian is assumed to be the same as an injury rendering a soldier combat ineffective. In addition to the 5% incidence of hospitalizing injuries, there will be an unspecified number of lesser injuries, assumed not to require hospitalization.

(1) Urban Environment. Civilians in this environment are assumed to be in the basements of one-story masonry buildings. Injuries to these civilians can occur because of either radiation or blast. The larger of the two radii (blast or radiation) is tabulated. For radiation, a 5% incidence of hospitalizing injuries will occur at an absorbed dose of 150 rad. For blast, a 5% incidence of hospitalizing injuries is assumed to occur when 5% of the buildings suffer severe damage. Thermal effects are not considered for personnel injuries inside of buildings.

(2) Rural Environment. Civilians in this environment are assumed to be in one-story wood-frame houses without basements. As discussed in the preceding paragraph, the larger radius associated with 150 rad for radiation, or 5% severe damage to buildings for blast, constitutes a 5% incidence of hospitalizing injuries. Thermal effects are not considered for civilians inside of buildings.

(3) Personnel in Open. The radii listed for this category equate to emergency risk to unwarned, exposed troops. Thermal, blast and radiation effects are all considered, and the largest of the three radii is tabulated.

b. Moderate Damage to Facilities. Radii listed are for 5% incidence of moderate damage. Fixed bridges are defined as single track railroad truss type bridges (most vulnerable). Railroad equipment is assumed to be full box cars, in a side-on orientation. Moderate damage to one-story masonry buildings is comparable to moderate damage to masonry buildings up to three stories and to POL and water storage tanks.

c. Thermal Ignition. Radii listed are the distances at which ignition (not necessarily sustained burning) is achieved. A probability of building damage cannot be associated with these radii.

1-10. CHAPTER 15 - GRAPHS AND TABLES. This chapter includes the graphs used for numerical analysis, the Comparable Target Table, the Radii of Vulnerability Table, the Transmission Factors, the Induced Radiation Table, and the MSD Modification as a Function of Previous Exposure Table.

1-11. APPENDICES. The References, Dual Fuzing Considerations, Blackout Effects of Nuclear Detonations on Radio Communications and Radar Transmission/Reception, Vulnerability of Army Tactical Equipment to EMP, and Simplified Reference Data are attached as appendices.

CHAPTER 2

WEAPON SYSTEM CHARACTERISTICS

2-1. SHORT RANGE CANNON (W10 WARHEAD).

a. General. This paragraph contains employment data for the short range cannon system.

b. Weapon Characteristics.

(1) Yield. The cannon system can fire nuclear projectiles with the following yields:

| <u>Warhead</u> | <u>Yield (KT)</u> | <u>99% Fallout Safe HOB (Range Dependent, Timer Fuze)</u> |
|----------------|-------------------|---|
| W10Y1 | 0.2 | 36-106 meters |
| W10Y2 | 1.0 | 48-206 meters |

(2) Fuzing. The nuclear projectiles for the short range cannon system have only an airburst fuzing capability. The projectiles are fuzed by time fuzes which are set for the desired time of flight by the delivery unit. These projectiles do not have a contact surface fuzing capability. If a projectile impacts, it can be expected to break up and dud. Actual heights of burst for optimum coverage with fallout preclusion are shown in the Coverage Tables.

(3) Preinitiation. See Chapter 3 for the necessary considerations when a multiple weapon attack is desired.

c. Employment Considerations.

(1) Range. The minimum and maximum ranges of the short range cannon system projectiles are 2,000 and 10,000 meters.

(2) Tactical System Accuracy. The system accuracy for the short range cannon system, as shown in the Coverage Tables, assumes a conditioned tube (warm, dry). The firing technique is predicted fire (MET+VE), where the meteorological data are 2 hours stale.

(3) Reaction Times. The times shown are intended primarily for use in command post exercises and during field training exercises in which handling, preparation and movement of a complete round or a delivery system are simulated. The times can also be used as a basis for general tactical planning. In situations where training or war reserve rounds and delivery units are physically present, and for detailed planning, the reaction times should be the actual times obtained from the artillery unit concerned. The times below are applicable to a reasonably well-trained unit operating in daylight under favorable weather conditions. Blackout operations, unfavorable weather, enemy interference or equipment breakdown will alter the times listed.

| <u>STATES OF READINESS</u> | <u>REACTION TIMES (minutes)</u> | <u>DESCRIPTION</u> |
|----------------------------|---------------------------------|---|
| II | 20 | The complete round and delivery system are in a firing position and survey is completed. Preliminary firing data for a specific target are not available. (May be used to engage target of opportunity.) |
| I | 3 | The round is positioned, fuzed and ready to fire. Firing data for a specific target have been computed and applied to the weapon system. The firing unit is in a "do not load" status awaiting the order to fire. (Typical of readiness to engage an on-call target.) |

(4) Special Considerations. The target analyst needs no special information from the unit fire direction center for target analysis. The fire mission to the unit includes the desired height of burst in meters.

2.2. MEDIUM RANGE CANNON (W15 WARHEAD).

a. General. This paragraph contains employment data for the medium range cannon system.

b. Weapon Characteristics.

(1) Yield. The medium range cannon system can fire nuclear projectiles with the following yields:

| <u>Warhead</u> | <u>Yield (KT)</u> | <u>99% Fallout Safe HOB (Range Dependent, Timer Fuze)</u> |
|----------------|-------------------|---|
| W15Y1 | 2.0 | 57-214 meters |
| W15Y2 | 8.0 | 80-237 meters |

(2) Fuzing. The nuclear projectiles for the medium range cannon system have only an airburst fuzing capability. The projectiles are fuzed by time fuzes which are set for the desired time of flight by the delivery unit. These projectiles do not have a contact surface fuzing capability. If a projectile impacts, it can be expected to break up and dud. Actual heights of burst for optimum coverage with fallout preclusion are shown in the Coverage Tables.

(3) Preinitiation. See Chapter 3 for the necessary considerations when a multiple weapon attack is desired.

c. Employment Considerations.

(1) Range. The minimum and maximum ranges of the medium range cannon system projectiles are 2,000 and 20,000 meters.

(2) Tactical System Accuracy. The system accuracy for the medium range cannon system, as shown in the Coverage Tables, assumes a conditioned tube (warm, dry). The firing technique is predicted fire (MET+VE), where the meteorological data are 2 hours stale.

(3) Reaction Times. The times shown are intended primarily for use in command post exercises and during field training exercises in which handling, preparation and movement of a complete round or a delivery system are simulated. The times can also be used as a basis for general tactical planning. In situations where training or war reserve rounds and delivery units are physically present, and for detailed planning, the reaction time should be the actual times obtained from the artillery unit concerned. The times below are applicable to a reasonably well-trained unit operating in daylight under favorable weather conditions. Blackout operations, unfavorable weather, enemy interference or equipment breakdown will alter the times listed.

| <u>STATES OF READINESS</u> | <u>REACTION TIMES (minutes)</u> | <u>DESCRIPTION</u> |
|----------------------------|---------------------------------|---|
| II | 20 | The complete round and delivery system are in a firing position, and survey is completed. Preliminary firing data for a specific target are not available. (May be used to engage target of opportunity.) |
| I | 3 | The round is positioned, fuzed and ready to fire. Firing data for a specific target have been computed and applied to the weapon system. The firing unit is in a "do not load" status awaiting the order to fire. (Typical of readiness to engage an on-call target.) |

(4) Special Considerations. The target analyst needs no special information from the unit fire direction center for target analysis. The fire mission to the unit includes the desired height of burst in meters.

2.3 FREE FLIGHT ROCKET (W20 WARHEAD).

a. General. This paragraph contains employment data for the free flight rocket system.

b. Weapon Characteristics.

(1) Yield. The free flight rocket system has the following yields:

| <u>Warhead</u> | <u>Yield (KT)</u> | <u>99% Fallout Safe HOB (Range Dependent, Timer Fuze)</u> |
|----------------|-------------------|---|
| W20Y1 | 5.0 | 140-753 meters |
| W20Y2 | 20.0 | 172-784 meters |

(2) Fuzing. The fuzing for the free flight rocket system provides airburst and impact fuzing options. The airburst option is fuzed with a dual mechanical timer - VT fuzing system. See Appendix B for details concerning this system. Setting the fuze for airburst precludes the use of the impact fuzing system as a backup.

(3) Preinitiation. See Chapter 3 for necessary considerations when a multiple weapon attack is desired.

c. Employment Considerations.

(1) Range. The minimum and maximum ranges of the free flight rocket are 5,000 and 60,000 meters.

(2) Tactical System Accuracy. Tactical system accuracy data are found in the Coverage Tables.

(3) Unit Carrying Capacity. A free-flight rocket unit can draw, transport, and store at any one time a total of 25 complete rounds per battalion.

(4) Reaction Times. The times shown below are intended primarily for use in command post exercises and during field training exercises in which handling, preparation and movement of a complete round or a delivery system are simulated. The times can also be used for general tactical planning. In situations where training or war reserve rounds and delivery units are physically present and for detailed tactical planning, the reaction times should be the actual times obtained from the artillery unit concerned. The times shown below are applicable to a reasonably well-trained unit operating in daylight under favorable weather conditions. Blackout operations, unfavorable weather, enemy interference, equipment breakdown or faulty test indications will extend the times listed.

| <u>STATES OF READINESS</u> | <u>REACTION TIMES (minutes)</u> | <u>DESCRIPTION</u> |
|----------------------------|---------------------------------|---|
| II | 30 | The complete round and launcher are in a firing position, and survey is completed. Preliminary firing data for a specific target are not available. Prefire checkouts which can be performed prior to the receipt of a fire mission have been completed. (May be used to engage targets of opportunity within range.) |
| I | 5 | Firing data for a specific target have been computed and applied to the weapon system. The unit is awaiting an order to fire. (Typical of readiness to engage on-call target.) |

Remarks: For State of Readiness II, add 20 minutes if a warhead section must be removed and a new warhead section with required yield mated to rocket.

(5) Special Considerations. See Appendix B.

2-4. GUIDED MISSILE (W30 WARHEAD).

a. General. This paragraph contains employment data for the guided missile system.

b. Weapon Characteristics.

(1) Yield. The guided missile system has yields of 10.0, 50.0 and 100.0 KT.

(2) Fuzing.

(a) The fuzing for the guided missile system provides airburst and impact fuzing options. The airburst option is radar-fuzed and can be set for either high or low airburst; these are the only heights of burst available. When the fuze is set for an airburst, the system provides for an option of either contact backup or contact preclusion.

(b) The fuzes are preset at the following heights of burst:

| <u>Warhead</u> | <u>Yield (KT)</u> | <u>HOB Option</u> | <u>HOB (meters)</u> | <u>PEH (meters)</u> |
|----------------|-------------------|-------------------|---------------------|---------------------|
| W30Y1 | 10.0 | Low | 242 | 50 |
| | | High | 402 | 50 |
| W30Y2 | 50.0 | Low | 289 | 50 |
| | | High | 562 | 50 |
| W30Y3 | 100.0 | Low | 439 | 50 |
| | | High | 663 | 50 |

(3) Preinitiation. See Chapter 3 for the necessary considerations when a multiple weapon attack is desired.

c. Employment Considerations.

(1) Range. The minimum and maximum ranges of the guided missile system are 50,000 and 150,000 meters.

(2) Tactical System Accuracy. The horizontal delivery errors for the guided missile system are range independent. The CEP is 500 meters.

(3) Unit Carrying Capacity. A guided missile unit can draw, transport, and store at any one time, a total of eight complete rounds per battalion.

(4) Reaction Times. The times shown below are intended primarily for use in command post exercises and during field training exercises in which handling, preparation and movement of a complete round are simulated. They can also be used as a basis for general tactical planning. In situations where training or war reserve rounds and delivery units are physically present, and in detailed tactical planning, the reaction time should be the actual time as obtained from the artillery unit concerned. The times shown below are applicable to a reasonably well-trained unit operating in daylight under favorable weather conditions. Blackout operations, unfavorable weather, enemy interference, equipment breakdown and faulty test indications will extend the times listed.

| <u>STATES OF READINESS</u> | <u>REACTION TIMES (minutes)</u> | <u>DESCRIPTION</u> |
|----------------------------|---------------------------------|---|
| II | 60 | The complete missile and launcher are in a firing position and survey is completed. Preliminary firing data for a specific target are not available. Prefire checkouts which can be performed prior to receipt of a fire mission have been completed. (May be used to engage targets of opportunity.) |
| I | 20 | Firing data for specific target have been computed and applied to the weapon system. The unit is awaiting an order to fire (typical of readiness to engage an on-call target). |

Remarks: For State of Readiness II, add 25 minutes if warhead section must be removed and a new warhead section with required yield mated to missile.

(5) Special Considerations. The target analyst needs no special information from the unit fire direction center for target analysis. For an airburst fuzing option, the fire mission to the unit includes the radar HOB setting, either High or Low, and whether or not contact backup or contact preclusion is desired. When contact backup is chosen, a fallout prediction is made. When an impact fuzing option is selected, the fire mission specifies HOB impact.

2-5. MK 50 BOMB.

a. This paragraph contains employment information applicable to the MK 50 Bomb delivered by Air Force, Navy, or Marine aircraft.

b. Weapon Characteristics.

(1) Yield. The MK 50 Bomb has yields of 3.0, 10.0 and 100.0 KT.

(2) Fuzing.

(a) The fuzing for the MK 50 Bomb provides airburst and impact fuzing options. The airburst option is radar fuzed and can be set for either high or low airburst; these are the only heights of burst available. Contact backup is provided in all cases where the airburst option is selected.

(b) The fuzes are preset at the following heights of burst:

| <u>Warhead</u> | <u>Yield (KT)</u> | <u>HOB Option</u> | <u>HOB (meters)</u> | <u>PEH (meters)</u> |
|----------------|-------------------|-------------------|---------------------|---------------------|
| MK50Y1 | 3.0 | Low | 220 | 50 |
| | | High | 350 | 50 |
| MK50Y2 | 10.0 | Low | 242 | 50 |
| | | High | 402 | 50 |
| MK50Y3 | 100.0 | Low | 439 | 50 |
| | | High | 663 | 50 |

(3) Preinitiation. See Chapter 3 for the necessary considerations when a multiple weapon attack is desired.

c. Employment Considerations.

(1) Tactical System Accuracy. Horizontal dispersion is dependent on the proficiency of the aircraft pilot and crew, and the technique of delivery. The CEP that can be expected for a particular mission will be obtained from the Air Force Liaison Officer. CEP of 100, 250, 500 and 750 meters are included in the Coverage Tables.

(2) Reaction Times. The times shown below are intended primarily for use in command post exercises and during field training exercises in which handling, preparation, and movement of bombs or aircraft are simulated. They can also be used as a basis for general tactical planning. In situations where training or war reserve bombs and aircraft are physically present, and in detailed tactical planning, reaction times should be the actual times obtained from the Air Force, Navy, or Marine unit concerned. The times listed below are expected times only. Such factors as distance and condition of the route to the bomb storage area, type of transportation and ground handling equipment and enemy activities may influence bomb preparation and loading.

| <u>STATES OF READINESS</u> | <u>REACTION TIME (minutes)</u> | <u>DESCRIPTION</u> |
|----------------------------|--------------------------------|--|
| II | 60 | Bomb is partially assembled and tested to allow shortest assembly time. The bomb is located in a storage area. |
| I | 10 | The bomb is assembled and loaded on the aircraft. The aircraft and crew are on ground alert. |

Remarks:

1. In both States of Readiness, flight time must be added to the times shown.
2. Time may vary in State of Readiness II as distance from storage area to aircraft varies.

(4) Special Considerations. The target analyst coordinates closely with the Air Liaison Officer representing the delivery unit concerned. The analyst needs to know the CEP involved, because CEP varies depending on the crew assigned and the delivery technique used to attack the target. When an airburst fuzing option is selected, the fire mission specifies the desired radar HOB setting as high or low. When an impact fuzing option is selected, the fire mission specifies HOB impact.

CHAPTER 3
PREINITIATION

3-1. GENERAL. Preinitiation is the premature commencement of fissioning in the active material of a nuclear weapon before the degree of design supercriticality is achieved, resulting in a reduced yield.

3-2. SEPARATING SUCCESSIVE NUCLEAR FIRES IN SPACE AND TIME. Preinitiation can be avoided by separating nuclear fires in space or time. The following table gives required waiting times as a function of adjusted distances between bursts, where adjusted distance is as shown in Figure 3-1.

| <u>Adjusted Distance Between Bursts (meters)</u> | <u>Minimum Waiting Time (minutes)</u> |
|--|---------------------------------------|
| Less than 1,000 | 3.0 |
| 1,000 - 2,499 | 2.0 |
| 2,500 - 4,999 | 1.5 |
| 5,000 - 7,499 | 1.0 |
| 7,500 - 9,999 | 0.5 |
| 10,000 and over | 0.0 |

Table 3-1. Minimum Waiting Times and Adjusted Distances For Successive Fires of Nuclear Weapons.

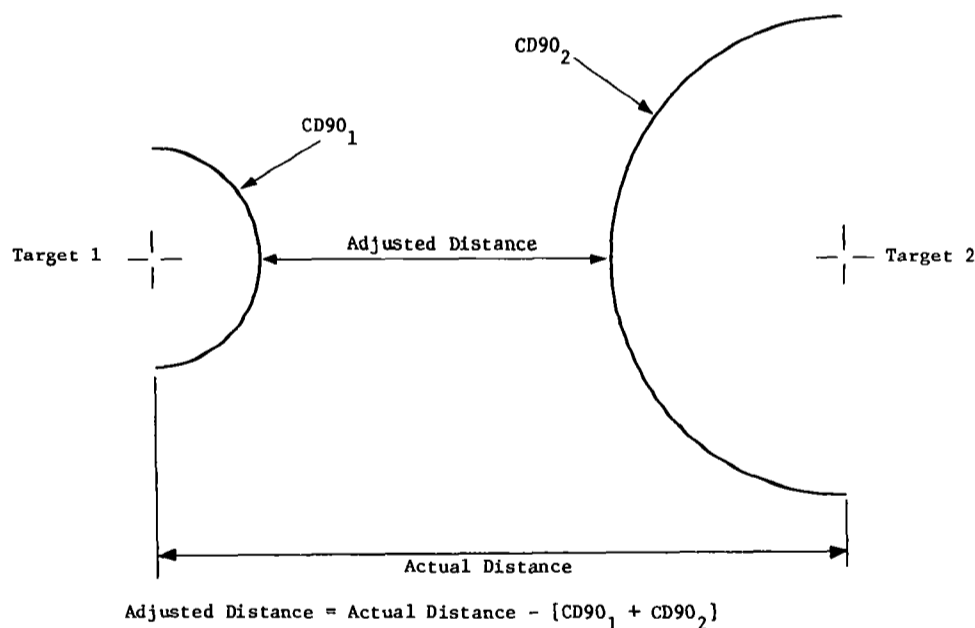


Figure 3-1. Definition of Adjusted Distance.

3-3. AVOIDING RADIOACTIVE NUCLEAR CLOUD. Preinitiation can also be avoided by not firing through the nuclear cloud of a previous burst. By detonating the most downwind and most distant weapon first, this situation should not occur. However, under certain conditions, a particular sequence of employment, etc. detonating the most downwind, and/or the most distant weapon first may not always be tactically advantageous. In situations, such as this, there is a possibility that a radioactive cloud produced by an upwind and/or less distant detonation could mask the direction of fire line for a subsequent weapon. The following procedure will be used to determine if this cloud could affect such targets.

a. Determine the masking zone. The first step is to construct the zone in which the center of the radioactive cloud must be located in order for a portion of the cloud to mask the direction of fire line.

- (1) Draw a line in the direction of fire through the target which may be affected by the radioactive cloud.
- (2) Determine the radius of the radioactive cloud produced by the upwind/less distant target. Refer to Table 3-2 for cloud radii.

| <u>Yield</u> | | <u>Cloud Radius (KM)</u> |
|---------------------|------------------------------|--------------------------|
| <u>Greater Than</u> | <u>Equal to or Less Than</u> | |
| - | 2 KT | 1.2 |
| 2 KT | 15 KT | 2.7 |
| 15 KT | 30 KT | 3.8 |
| 30 KT | 75 KT | 5.5 |
| 75 KT | - | 8.4 |

Table 3-2. Cloud Radius Versus Yield.

(3) Draw a line parallel to the direction of fire line on both sides of the direction of fire line and at a distance of one cloud radius away.

(4) The area inclosed within the cloud radius lines is the masking zone.

b. Determine the masking time interval. The second step is to determine the time interval during which the center of the drifting radioactive cloud will be in the masking zone.

(1) Draw a line from the target producing the cloud in the effective downwind direction. The effective downwind direction for the yield concerned is obtained from the chemical, biological, radiological elements (CBRE). (The CBRE determines this parameter from data provided by the division or corps field artillery meteorological section and/or the Air Force air weather service.) If, when scheduling nuclear fires, an effective downwind direction is required, the most up-to-date data should be used.

(2) Measure the distances from the target producing the radioactive cloud to the points of intersection of the cloud radius lines and the wind direction line.

(3) Determine the effective downwind speed (EDWS) in the target area for yield of the weapon producing the cloud concerned. (The CBRE determines the EDWS.)

(4) Based on the EDWS, compute the rate of cloud drift per minute. This is accomplished by dividing the EDWS by 60 minutes per hour.

(5) Divide the distance determined in (2) above by the rate of cloud drift per minute determined in (4) above.

(6) The two times calculated are the limits on the separation time interval within which masking will occur. If the separation time between detonations is in this interval, the radioactive cloud will mask, increasing the possibility of preinitiation. If this is the case, the separation time between detonations must be reduced or increased so that it is not within the masking time interval, or the sequence is impossible and the downwind, more distant target will have to be detonated first.

MARK 50 BOMB

COVERAGE TABLE

(Distances in meters)

EXPOSED PERSONNEL - IMMEDIATE PERMANENT
LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 400 | 600 | 700 | 1000 | 1100 | 1300 | 1600 | 2000 | | | | | | |
| 3 KT [7-46] | .95/.97 | .86/.91 | .77/.83 | .45/.51 | .36/.43 | .20/.30 | .10/.20 | .10/.12 | 663 | 69P | 182 | 100 | 220 | 50 |
| | .77/.91 | .64/.80 | .58/.73 | .42/.49 | .36/.42 | .26/.30 | .16/.20 | .10/.12 | 663 | 69P | 455 | 250 | 220 | 50 |
| | .18/.65 | .23/.57 | .24/.53 | .25/.40 | .24/.36 | .21/.28 | .10/.20 | .10/.12 | 663 | 69P | 911 | 500 | 220 | 50 |
| | .01/.42 | .03/.39 | .03/.37 | .08/.30 | .09/.28 | .11/.24 | .12/.18 | .10/.12 | 663 | 69P | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | 600 | 900 | 1000 | 1300 | 1450 | 1700 | 2100 | 2900 | 870 | 903 | 182 | 100 | 242 | 50 |
| | .95/.97 | .80/.85 | .71/.76 | .46/.50 | .36/.40 | .26/.30 | .16/.19 | .06/.11 | | | | | | |
| | .84/.93 | .67/.78 | .61/.71 | .45/.50 | .36/.40 | .26/.30 | .16/.19 | .06/.11 | | | | | | |
| | .42/.75 | .39/.62 | .38/.58 | .33/.44 | .31/.38 | .25/.29 | .16/.19 | .06/.11 | | | | | | |
| 100 KT [11-218] | 800 | 1200 | 1300 | 1700 | 1900 | 2300 | 2800 | 3500 | 113A | 1229 | 182 | 100 | 439 | 50 |
| | .95/.97 | .81/.86 | .73/.80 | .46/.54 | .36/.44 | .25/.30 | .16/.20 | .11/.13 | | | | | | |
| | .91/.95 | .73/.82 | .67/.77 | .46/.54 | .36/.44 | .25/.30 | .16/.20 | .11/.13 | | | | | | |
| | .65/.85 | .53/.71 | .51/.67 | .41/.50 | .35/.42 | .25/.30 | .16/.20 | .11/.13 | | | | | | |
| | .33/.71 | .33/.60 | .33/.57 | .30/.45 | .28/.39 | .22/.29 | .16/.20 | .11/.13 | 113A | 1229 | 1366 | 750 | 439 | 50 |

COVERAGE TABLE

(Distances in meters)

EXPOSED PERSONNEL - IMMEDIATE TRANSIENT
LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 400 | 800 | 1000 | 1200 | 1400 | 1600 | 2000 | 2400 | | | | | | |
| 3 KT [7-46] | .95/.97 | .86/.91 | .70/.75 | .51/.56 | .38/.42 | .28/.32 | .17/.21 | .10/.12 | 854 | 880 | 182 | 100 | 220 | 50 |
| | .92/.96 | .71/.83 | .59/.69 | .48/.54 | .37/.41 | .28/.32 | .17/.21 | .10/.12 | 854 | 880 | 455 | 250 | 220 | 50 |
| | .42/.79 | .38/.65 | .36/.56 | .34/.47 | .31/.38 | .20/.31 | .17/.21 | .10/.12 | 854 | 880 | 911 | 500 | 220 | 50 |
| | .04/.57 | .12/.49 | .15/.43 | .17/.38 | .18/.33 | .10/.27 | .10/.20 | .10/.12 | 854 | 880 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | 800 | 1100 | 1250 | 1600 | 1800 | 2050 | 2400 | 3200 | 108A | 1114 | 182 | 100 | 242 | 50 |
| | .95/.97 | .82/.86 | .72/.76 | .47/.51 | .36/.41 | .27/.31 | .20/.22 | .10/.12 | | | | | | |
| | .87/.93 | .72/.81 | .65/.73 | .46/.51 | .36/.41 | .27/.31 | .20/.22 | .10/.12 | | | | | | |
| | .57/.80 | .50/.69 | .47/.62 | .40/.47 | .35/.39 | .27/.31 | .20/.22 | .10/.12 | | | | | | |
| 100 KT [11-218] | 1000 | 1400 | 1600 | 2000 | 2300 | 2600 | 3200 | 3500 | 139A | 1437 | 182 | 100 | 439 | 50 |
| | .95/.97 | .85/.87 | .72/.76 | .50/.54 | .36/.41 | .28/.32 | .18/.22 | .15/.17 | | | | | | |
| | .91/.96 | .77/.84 | .69/.75 | .50/.54 | .36/.41 | .28/.32 | .18/.22 | .15/.17 | | | | | | |
| | .73/.88 | .61/.75 | .55/.67 | .45/.51 | .36/.40 | .28/.32 | .18/.22 | .15/.17 | | | | | | |
| | .47/.76 | .43/.65 | .41/.59 | .36/.47 | .32/.38 | .27/.31 | .18/.22 | .15/.17 | 139A | 1437 | 1366 | 750 | 439 | 50 |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

EXPOSED PERSONNEL - LATENT LETHALITY LOW AIRBURST

| YIELD | EFFECTIVENESS RADIUS OF TARGET | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | 800 | 1100 | 1300 | 1700 | 1900 | 2200 | 2700 | 3200 | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | .95/.97 | .86/.91 | .75/.77 | .47/.51 | .38/.42 | .27/.31 | .17/.21 | .10/.12 | 1164 | 1184 | 182 | 100 | 220 | 50 |
| | .90/.95 | .77/.86 | .67/.74 | .46/.51 | .38/.42 | .27/.31 | .17/.21 | .10/.12 | 1164 | 1184 | 455 | 250 | 220 | 50 |
| | .63/.84 | .54/.73 | .50/.65 | .41/.47 | .36/.40 | .27/.31 | .17/.21 | .10/.12 | 1164 | 1184 | 911 | 500 | 220 | 50 |
| | .31/.68 | .31/.60 | .31/.54 | .29/.42 | .28/.37 | .25/.29 | .17/.21 | .10/.12 | 1164 | 1184 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | .95/.97 | .81/.85 | .70/.72 | .48/.52 | .40/.42 | .28/.32 | .20/.22 | .10/.12 | 1446 | 1464 | 182 | 100 | 242 | 50 |
| | .90/.94 | .76/.81 | .67/.71 | .48/.52 | .40/.42 | .28/.32 | .20/.22 | .10/.12 | 1446 | 1464 | 455 | 250 | 242 | 50 |
| | .72/.86 | .60/.73 | .54/.65 | .44/.49 | .40/.42 | .28/.32 | .20/.22 | .10/.12 | 1446 | 1464 | 911 | 500 | 242 | 50 |
| | .47/.75 | .43/.63 | .41/.57 | .36/.46 | .33/.40 | .26/.31 | .20/.22 | .10/.12 | 1446 | 1464 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | .95/.97 | .81/.84 | .71/.74 | .50/.52 | .40/.42 | .31/.34 | .20/.22 | .15/.17 | 1800 | 1843 | 182 | 100 | 434 | 50 |
| | .91/.95 | .77/.82 | .70/.73 | .50/.52 | .40/.42 | .31/.34 | .20/.22 | .15/.17 | 1800 | 1843 | 455 | 250 | 434 | 50 |
| | .80/.90 | .66/.76 | .60/.69 | .47/.51 | .40/.42 | .31/.34 | .20/.22 | .15/.17 | 1800 | 1843 | 911 | 500 | 434 | 50 |
| | .62/.82 | .53/.69 | .50/.63 | .42/.49 | .37/.41 | .31/.34 | .20/.22 | .15/.17 | 1800 | 1843 | 1366 | 750 | 434 | 50 |

SAFETY DISTANCE TABLE (Distances in meters)

TROOP SAFETY (MSD) ----- PRECLUDE (LSD) -----

| YIELD | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED | LT DAM TO | LT OBSN UTIL | LT ACFT ASLT | IN FLIGHT CARGO | OV-1B HEL | FOREST BLOWDOWN | WILDLAND FIRES CLASS I | WILDLAND FIRES CLASS IV |
|--------------------|------------------|-------|-------|----------------|-------|------|------------------|------|-------|---------------|-----------|--------------|--------------|-----------------|-----------|-----------------|------------------------|-------------------------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | HEL | DECID | CONIF | | |
| 3 KT [7-46] | 5000 | 4700 | 3100 | 3100 | 2800 | 2300 | 3200 | 2900 | 1600* | 800 | 4300 | 4500 | 4900 | 3400 | 2000 | 1400 | 3600 | 2300 |
| | 5000 | 5000 | 3500 | 3500 | 3200 | 2600 | 3600 | 3300 | 2000* | 1000 | 4300 | 4500 | 4900 | 3400 | 2100 | 1600 | 3600 | 2300 |
| | 6000 | 5700 | 4100 | 4100 | 3900 | 3300 | 4300 | 3900 | 2600* | 1200 | 4500 | 4700 | 5000 | 3600 | 2300 | 1800 | 3800 | 2600 |
| | 6700 | 6400 | 4800 | 4800 | 4600 | 4000 | 4900 | 4600 | 3300* | 1200 | 4700 | 4900 | 5200 | 3900 | 2500 | 2000 | 4100 | 2800 |
| 10 KT [9-80] | 8500 | 7600 | 5000 | 4800 | 4500 | 3700 | 4500 | 4000 | 1900* | 1200 | 6200 | 7300 | 7700 | 6500 | 3000 | 2200 | 5900 | 3900 |
| | 8700 | 8100 | 5400 | 5300 | 5000 | 4100 | 5000 | 4500 | 2300* | 1400 | 6200 | 7300 | 7700 | 6500 | 3000 | 2300 | 5900 | 3900 |
| | 9400 | 8800 | 6100 | 6000 | 5700 | 4800 | 5700 | 5200 | 3000* | 1600 | 6300 | 7300 | 7600 | 6500 | 3300 | 2500 | 6000 | 4200 |
| | 10100 | 9500 | 6800 | 6700 | 6400 | 5500 | 6400 | 5900 | 3700* | 1800 | 6500 | 7600 | 7900 | 6800 | 3600 | 2800 | 6200 | 4400 |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 8800 | 7800 | 3400 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 9200 | 8300 | 3800 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 |
| | 23500 | 21600 | 14000 | 12500 | 11600 | 9000 | 9900 | 9000 | 4500 | 3100 | 12500 | 16900 | 16900 | 16900 | 6800 | 5400 | 14500 | 8900 |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 10600 | 9700 | 5200 | 3300 | 12500 | 16900 | 16900 | 16900 | 7100 | 5600 | 14500 | 9100 |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

MARK 50 BOMB

COVERAGE TABLE

(Distances in meters)

PERSONNEL IN OPEN FOXHOLES - IMMEDIATE PERMANENT
LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 200 | 325 | 425 | 650 | 750 | 850 | 1050 | 1350 | | | | | | |
| 3 KT [7-46] | .95/.97 | .87/.94 | .75/.86 | .41/.54 | .31/.42 | .25/.33 | .15/.21 | .10/.13 | 421 | 474 | 182 | 100 | 220 | 50 |
| | .49/.83 | .44/.76 | .41/.68 | .33/.47 | .27/.39 | .23/.32 | .15/.21 | .10/.13 | 421 | 474 | 455 | 250 | 220 | 50 |
| | .01/.44 | .02/.42 | .03/.39 | .07/.32 | .10/.29 | .11/.25 | .11/.19 | .09/.13 | 421 | 474 | 911 | 500 | 220 | 50 |
| | .00/.25 | .00/.24 | .00/.23 | .00/.20 | .01/.19 | .02/.18 | .03/.15 | .05/.11 | 421 | 474 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | .95/.97 | .84/.90 | .73/.82 | .50/.58 | .35/.43 | .25/.30 | .16/.20 | .07/.11 | 593 | 640 | 182 | 100 | 242 | 50 |
| | .69/.87 | .59/.78 | .53/.70 | .43/.53 | .34/.42 | .25/.30 | .16/.20 | .07/.11 | 593 | 640 | 455 | 250 | 242 | 50 |
| | .12/.59 | .16/.54 | .19/.49 | .21/.41 | .21/.35 | .20/.27 | .15/.19 | .07/.11 | 593 | 640 | 911 | 500 | 242 | 50 |
| | .01/.37 | .02/.35 | .02/.33 | .04/.29 | .06/.26 | .08/.22 | .10/.17 | .07/.11 | 593 | 640 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | .95/.97 | .82/.88 | .72/.81 | .45/.54 | .32/.40 | .25/.30 | .17/.22 | .10/.12 | 795 | 860 | 182 | 100 | 439 | 50 |
| | .86/.94 | .67/.81 | .61/.74 | .44/.52 | .32/.40 | .25/.30 | .17/.22 | .10/.12 | 795 | 860 | 455 | 250 | 439 | 50 |
| | .38/.75 | .36/.63 | .35/.59 | .32/.45 | .28/.37 | .23/.29 | .17/.21 | .10/.12 | 795 | 860 | 911 | 500 | 439 | 50 |
| | .04/.54 | .11/.47 | .12/.44 | .16/.37 | .17/.31 | .17/.26 | .15/.20 | .10/.12 | 795 | 860 | 1366 | 750 | 439 | 50 |

COVERAGE TABLE

(Distances in meters)

PERSONNEL IN OPEN FOXHOLES - IMMEDIATE TRANSIENT
LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 400 | 550 | 650 | 900 | 1000 | 1200 | 1500 | 1800 | | | | | | |
| 3 KT [7-46] | .95/.97 | .85/.91 | .75/.82 | .45/.53 | .37/.44 | .25/.30 | .16/.20 | .10/.12 | 603 | 642 | 182 | 100 | 220 | 50 |
| | .70/.88 | .60/.78 | .54/.71 | .41/.50 | .36/.43 | .25/.30 | .16/.20 | .10/.12 | 603 | 642 | 455 | 250 | 220 | 50 |
| | .12/.59 | .16/.54 | .19/.50 | .21/.39 | .21/.35 | .20/.27 | .15/.19 | .10/.12 | 603 | 642 | 911 | 500 | 220 | 50 |
| | .01/.57 | .02/.35 | .02/.33 | .04/.29 | .06/.27 | .08/.22 | .10/.17 | .10/.12 | 603 | 642 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | .92/.96 | .81/.86 | .72/.79 | .45/.50 | .35/.40 | .28/.32 | .16/.21 | .06/.11 | 797 | 834 | 182 | 100 | 242 | 50 |
| | .78/.90 | .66/.78 | .60/.72 | .43/.49 | .35/.40 | .28/.32 | .16/.21 | .06/.11 | 797 | 834 | 455 | 250 | 242 | 50 |
| | .35/.70 | .35/.61 | .34/.57 | .31/.43 | .28/.37 | .25/.30 | .16/.20 | .06/.11 | 797 | 834 | 911 | 500 | 242 | 50 |
| | .05/.50 | .09/.45 | .11/.43 | .16/.35 | .16/.31 | .17/.27 | .15/.19 | .06/.11 | 797 | 834 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | .95/.97 | .80/.85 | .71/.78 | .48/.56 | .38/.43 | .27/.31 | .16/.20 | .10/.12 | 1039 | 1093 | 182 | 100 | 439 | 50 |
| | .90/.95 | .70/.79 | .65/.74 | .47/.55 | .38/.43 | .27/.31 | .16/.20 | .10/.12 | 1039 | 1093 | 455 | 250 | 439 | 50 |
| | .58/.83 | .48/.67 | .46/.63 | .40/.50 | .35/.41 | .26/.31 | .16/.20 | .10/.12 | 1039 | 1093 | 911 | 500 | 439 | 50 |
| | .23/.66 | .27/.55 | .27/.52 | .27/.43 | .26/.37 | .22/.29 | .16/.20 | .10/.12 | 1039 | 1093 | 1366 | 750 | 439 | 50 |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN OPEN FOXHOLES - LATENT LETHALITY LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | 600 | 900 | 1000 | 1300 | 1500 | 1700 | 2100 | 2500 | | | | | | |
| | .95/.97 | .82/.86 | .75/.79 | .48/.51 | .36/.40 | .27/.31 | .16/.21 | .10/.12 | 89% | 92% | 182 | 100 | 220 | 50 |
| | .85/.93 | .68/.79 | .63/.73 | .46/.51 | .36/.40 | .27/.31 | .16/.21 | .10/.12 | 89% | 92% | 455 | 250 | 220 | 50 |
| | .44/.76 | .40/.64 | .39/.59 | .35/.45 | .31/.37 | .26/.30 | .16/.20 | .10/.12 | 89% | 92% | 911 | 500 | 220 | 50 |
| 10 KT [9-80] | 800 | 1150 | 1300 | 1650 | 1850 | 2150 | 2600 | 3500 | | | | | | |
| | .95/.97 | .82/.86 | .71/.75 | .47/.51 | .37/.41 | .26/.31 | .18/.22 | .10/.12 | 112% | 1154 | 182 | 100 | 242 | 50 |
| | .89/.94 | .73/.81 | .66/.72 | .46/.51 | .37/.41 | .26/.31 | .18/.22 | .10/.12 | 112% | 1154 | 455 | 250 | 242 | 50 |
| | .61/.82 | .51/.69 | .48/.63 | .41/.47 | .35/.40 | .26/.30 | .18/.22 | .10/.12 | 112% | 1154 | 911 | 500 | 242 | 50 |
| 100 KT [11-218] | 1100 | 1500 | 1650 | 2100 | 2300 | 2700 | 3300 | 3500 | | | | | | |
| | .95/.97 | .81/.84 | .71/.76 | .46/.51 | .40/.43 | .27/.31 | .17/.21 | .16/.18 | 142% | 1468 | 182 | 100 | 439 | 50 |
| | .90/.94 | .75/.81 | .69/.74 | .46/.51 | .40/.43 | .27/.31 | .17/.21 | .16/.18 | 142% | 1468 | 455 | 250 | 439 | 50 |
| | .72/.86 | .60/.73 | .55/.67 | .44/.49 | .38/.42 | .27/.31 | .17/.21 | .16/.18 | 142% | 1468 | 911 | 500 | 439 | 50 |
| | .47/.75 | .43/.64 | .41/.59 | .36/.46 | .33/.40 | .26/.31 | .17/.21 | .16/.18 | 142% | 1468 | 1366 | 750 | 439 | 50 |

SAFETY DISTANCE TABLE (Distances in meters)

TROOP SAFETY (MSD) ----- PRECLUDE (LSD) -----

| YIELD | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED | LT DAM TO | LT ACFT OBSN UTIL | IN FLIGHT ASLT HEL | OV-1B CARGO HEL | FOREST BLOWDOWN DECID | CONIF | WILDLAND FIRES CLASS I IV | |
|--------------------|------------------|-------|-------|----------------|-------|------|------------------|------|-------|---------------|-----------|-------------------|--------------------|-----------------|-----------------------|-------|---------------------------|------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | HEL | HEL | HEL | HEL | |
| 3 KT [7-46] | 5000 | 4700 | 3100 | 3100 | 2800 | 2300 | 3200 | 2900 | 1600* | 800 | 4300 | 4500 | 4900 | 3400 | 2000 | 1400 | 3600 | 2300 |
| | 5300 | 5000 | 3500 | 3500 | 3200 | 2600 | 3600 | 3300 | 2000* | 1000 | 4300 | 4500 | 4900 | 3400 | 2100 | 1600 | 3600 | 2300 |
| | 6000 | 5700 | 4100 | 4100 | 3900 | 3300 | 4300 | 3900 | 2600* | 1200 | 4500 | 4700 | 5000 | 3600 | 2300 | 1800 | 3800 | 2600 |
| | 6700 | 6400 | 4800 | 4800 | 4600 | 4000 | 4900 | 4600 | 3300* | 1200 | 4700 | 4900 | 5200 | 3900 | 2500 | 2000 | 4100 | 2800 |
| 10 KT [9-80] | 6300 | 7600 | 5000 | 4800 | 4500 | 3700 | 4500 | 4000 | 1900* | 1200 | 6200 | 7300 | 7700 | 6500 | 3000 | 2200 | 5900 | 3900 |
| | 6700 | 8100 | 5400 | 5300 | 5000 | 4100 | 5000 | 4500 | 2300* | 1400 | 6200 | 7300 | 7700 | 6500 | 3000 | 2300 | 5900 | 3900 |
| | 9400 | 8800 | 6100 | 6000 | 5700 | 4800 | 5700 | 5200 | 3000* | 1600 | 6300 | 7300 | 7600 | 6500 | 3300 | 2500 | 6000 | 4200 |
| | 10100 | 9500 | 6800 | 6700 | 6400 | 5500 | 6400 | 5900 | 3700* | 1800 | 6500 | 7600 | 7900 | 6800 | 3600 | 2800 | 6200 | 4400 |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 8800 | 7800 | 3400 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 9200 | 8300 | 3800 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 |
| | 23300 | 21600 | 14000 | 12500 | 11600 | 9000 | 9800 | 9000 | 4500 | 3100 | 12500 | 16900 | 16900 | 16900 | 6800 | 5400 | 14500 | 8900 |
| | 24600 | 22300 | 14700 | 13200 | 12300 | 9700 | 10600 | 9700 | 5200 | 3300 | 12500 | 16900 | 16900 | 16900 | 7100 | 5600 | 14500 | 9100 |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN TANKS - IMMEDIATE PERMANENT LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 300 | 450 | 550 | 750 | 850 | 1000 | 1200 | 1600 | | | | | | |
| 3 KT [7-46] | .95/.97 | .82/.90 | .70/.80 | .42/.53 | .32/.42 | .25/.30 | .16/.21 | .06/.12 | 488 | 535 | 182 | 100 | 220 | 50 |
| | .58/.84 | .50/.74 | .46/.66 | .37/.48 | .31/.40 | .25/.29 | .16/.21 | .08/.12 | 488 | 535 | 455 | 250 | 220 | 50 |
| | .03/.50 | .05/.46 | .08/.42 | .13/.35 | .14/.31 | .15/.25 | .14/.20 | .08/.12 | 484 | 535 | 911 | 500 | 220 | 50 |
| | .00/.29 | .00/.28 | .00/.26 | .02/.23 | .02/.22 | .03/.19 | .05/.16 | .06/.11 | 488 | 535 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | 500 | 650 | 750 | 1000 | 1150 | 1350 | 1600 | 2100 | 661 | 704 | 182 | 100 | 242 | 50 |
| | .92/.96 | .81/.89 | .71/.79 | .45/.52 | .33/.39 | .23/.28 | .16/.21 | .10/.12 | 661 | 704 | 455 | 250 | 242 | 50 |
| | .71/.87 | .61/.77 | .55/.70 | .42/.50 | .33/.39 | .23/.28 | .16/.21 | .10/.12 | 661 | 704 | 911 | 500 | 242 | 50 |
| | .21/.62 | .24/.56 | .25/.52 | .25/.41 | .24/.34 | .21/.27 | .16/.20 | .10/.12 | 661 | 704 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | 600 | 850 | 1000 | 1300 | 1500 | 1700 | 2100 | 2700 | 852 | 914 | 182 | 100 | 439 | 50 |
| | .95/.97 | .83/.89 | .70/.77 | .43/.51 | .33/.40 | .25/.30 | .16/.20 | .10/.12 | 852 | 914 | 455 | 250 | 439 | 50 |
| | .84/.93 | .70/.82 | .61/.72 | .42/.50 | .33/.39 | .25/.30 | .16/.20 | .10/.12 | 852 | 914 | 911 | 500 | 439 | 50 |
| | .43/.75 | .40/.65 | .38/.59 | .33/.45 | .30/.37 | .24/.29 | .16/.20 | .10/.12 | 852 | 914 | 1366 | 750 | 439 | 50 |
| | .09/.56 | .14/.50 | .17/.46 | .19/.37 | .20/.32 | .19/.27 | .15/.19 | .10/.12 | 852 | 914 | | | | |

COVERAGE TABLE (Distances in meters)

PERSONNEL IN TANKS - IMMEDIATE TRANSIENT LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 400 | 650 | 750 | 1000 | 1100 | 1300 | 1600 | 2000 | | | | | | |
| 3 KT [7-46] | .95/.97 | .82/.88 | .72/.79 | .45/.52 | .37/.43 | .25/.30 | .16/.21 | .10/.12 | 666 | 701 | 182 | 100 | 220 | 50 |
| | .78/.91 | .61/.77 | .55/.69 | .42/.49 | .36/.42 | .25/.30 | .16/.21 | .10/.12 | 666 | 701 | 455 | 250 | 220 | 50 |
| | .18/.65 | .24/.56 | .25/.51 | .25/.40 | .24/.36 | .21/.28 | .16/.20 | .10/.12 | 666 | 701 | 911 | 500 | 220 | 50 |
| | .01/.42 | .03/.38 | .04/.36 | .08/.31 | .09/.28 | .11/.24 | .12/.18 | .10/.12 | 666 | 701 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | 600 | 900 | 1000 | 1300 | 1450 | 1650 | 2050 | 2600 | 859 | 893 | 182 | 100 | 242 | 50 |
| | .95/.97 | .80/.84 | .71/.75 | .45/.49 | .36/.40 | .27/.31 | .16/.21 | .10/.12 | 859 | 893 | 455 | 250 | 242 | 50 |
| | .83/.92 | .66/.77 | .60/.70 | .43/.49 | .36/.40 | .27/.31 | .16/.21 | .10/.12 | 859 | 893 | 911 | 500 | 242 | 50 |
| | .41/.74 | .38/.61 | .37/.57 | .33/.43 | .30/.38 | .25/.30 | .16/.21 | .10/.12 | 859 | 893 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | 800 | 1100 | 1250 | 1600 | 1800 | 2100 | 2600 | 3200 | 1082 | 1134 | 182 | 100 | 439 | 50 |
| | .95/.97 | .83/.87 | .71/.77 | .46/.52 | .36/.42 | .26/.31 | .16/.20 | .10/.13 | 1082 | 1134 | 455 | 250 | 439 | 50 |
| | .88/.94 | .73/.82 | .66/.74 | .46/.52 | .36/.42 | .26/.31 | .16/.20 | .10/.13 | 1082 | 1134 | 911 | 500 | 439 | 50 |
| | .59/.81 | .51/.70 | .47/.63 | .40/.48 | .34/.40 | .26/.30 | .16/.20 | .10/.13 | 1082 | 1134 | 1366 | 750 | 439 | 50 |
| | .27/.66 | .29/.57 | .29/.53 | .28/.42 | .26/.37 | .23/.29 | .16/.20 | .10/.13 | 1082 | 1134 | | | | |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN TANKS - LATENT LETHALITY LOW AIRBURST

| YIELD | EFFECTIVENESS RADIUS OF TARGET | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | 700 | 1000 | 1100 | 1400 | 1500 | 1800 | 2200 | 2700 | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | .95/.97 | .80/.84 | .71/.75 | .47/.51 | .41/.44 | .27/.31 | .17/.21 | .10/.12 | 950 | 973 | 182 | 100 | 220 | 50 |
| | .84/.92 | .67/.77 | .62/.71 | .46/.50 | .40/.44 | .27/.31 | .17/.21 | .10/.12 | 950 | 973 | 455 | 250 | 220 | 50 |
| | .48/.76 | .43/.63 | .41/.59 | .36/.45 | .34/.41 | .26/.30 | .17/.21 | .10/.12 | 950 | 973 | 911 | 500 | 220 | 50 |
| 10 KT [9-80] | .15/.58 | .20/.50 | .21/.47 | .22/.39 | .22/.36 | .21/.28 | .16/.21 | .10/.12 | 950 | 973 | 1366 | 750 | 220 | 50 |
| | .94/.97 | .82/.86 | .72/.76 | .46/.50 | .40/.42 | .25/.27 | .20/.22 | .11/.15 | 117A | 1202 | 182 | 100 | 242 | 50 |
| | .87/.93 | .73/.81 | .66/.73 | .46/.49 | .40/.42 | .25/.27 | .20/.22 | .11/.15 | 117A | 1202 | 455 | 250 | 242 | 50 |
| 100 KT [11-218] | .61/.82 | .53/.70 | .50/.64 | .41/.47 | .36/.41 | .25/.27 | .20/.22 | .11/.15 | 117A | 1202 | 911 | 500 | 242 | 50 |
| | .32/.67 | .32/.58 | .32/.54 | .30/.42 | .28/.38 | .24/.27 | .20/.22 | .11/.15 | 117A | 1202 | 1366 | 750 | 242 | 50 |
| | .95/.97 | .81/.86 | .70/.73 | .48/.52 | .36/.40 | .28/.32 | .18/.22 | .10/.12 | 1443 | 1485 | 182 | 100 | 439 | 50 |
| 100 KT [11-218] | .90/.94 | .76/.82 | .67/.72 | .48/.52 | .36/.40 | .28/.32 | .18/.22 | .10/.12 | 1443 | 1485 | 455 | 250 | 439 | 50 |
| | .73/.87 | .60/.74 | .55/.66 | .45/.50 | .36/.40 | .28/.32 | .18/.22 | .10/.12 | 1443 | 1485 | 911 | 500 | 439 | 50 |
| | .49/.76 | .44/.64 | .41/.58 | .37/.46 | .32/.38 | .27/.31 | .18/.22 | .10/.12 | 1443 | 1485 | 1366 | 750 | 439 | 50 |

SAFETY DISTANCE TABLE (Distances in meters)

TROOP SAFETY (MSD) ----- PRECLUDE (LSD) -----

| YIELD | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED | LT DAM TO | LT ACFT OBSN UTIL | IN FLIGHT OV-1B ASLT HEL | FOREST BLOWDOWN DECID | WILDLAND FIRES CLASS I | CLASS IV | | |
|--------------------|------------------|-------|-------|----------------|-------|------|------------------|------|-------|---------------|-----------|-------------------|--------------------------|-----------------------|------------------------|----------|-------|------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | HEL | CONIF | | | |
| 3 KT [7-46] | 5000 | 4700 | 3100 | 3100 | 2800 | 2300 | 3200 | 2900 | 1600* | 800 | 4300 | 4500 | 4900 | 3400 | 2000 | 1400 | 3600 | 2300 |
| | 5500 | 5000 | 3500 | 3500 | 3200 | 2600 | 3600 | 3300 | 2000* | 1000 | 4300 | 4500 | 4900 | 3400 | 2100 | 1600 | 3600 | 2300 |
| | 6000 | 5700 | 4100 | 4100 | 3900 | 3300 | 4300 | 3900 | 2600* | 1200 | 4500 | 4700 | 5000 | 3600 | 2300 | 1800 | 3800 | 2600 |
| | 6700 | 6400 | 4800 | 4800 | 4600 | 4000 | 4900 | 4600 | 3300* | 1200 | 4700 | 4900 | 5200 | 3900 | 2500 | 2000 | 4100 | 2800 |
| 10 KT [9-80] | 8300 | 7600 | 5000 | 4800 | 4500 | 3700 | 4500 | 4000 | 1900* | 1200 | 6200 | 7300 | 7700 | 6500 | 3000 | 2200 | 5900 | 3900 |
| | 8700 | 8100 | 5400 | 5300 | 5000 | 4100 | 5000 | 4500 | 2300* | 1400 | 6200 | 7300 | 7700 | 6500 | 3000 | 2300 | 5900 | 3900 |
| | 9400 | 8800 | 6100 | 6000 | 5700 | 4800 | 5700 | 5200 | 3000* | 1600 | 6300 | 7300 | 7600 | 6500 | 3300 | 2500 | 6000 | 4200 |
| | 10100 | 9500 | 6800 | 6700 | 6400 | 5500 | 6400 | 5900 | 3700* | 1800 | 6500 | 7600 | 7900 | 6800 | 3600 | 2800 | 6200 | 4400 |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 8400 | 7800 | 3400 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 9200 | 8300 | 3800 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 |
| | 23300 | 21600 | 14000 | 12500 | 11600 | 9000 | 9900 | 9000 | 4500 | 3100 | 12500 | 16900 | 16900 | 16900 | 6800 | 5400 | 14500 | 8900 |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 10600 | 9700 | 5200 | 3300 | 12500 | 16900 | 16900 | 16900 | 7100 | 5600 | 14500 | 9100 |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

MARK 50 BOMB

COVERAGE TABLE

(Distances in meters)

MODERATE DAMAGE TO TANKS LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 25 | 50 | 75 | 100 | 250 | 325 | 425 | 600 | | | | | | |
| 3 KT [7-46] | .00/.57 | .00/.56 | .00/.55 | .00/.54 | .01/.40 | .01/.31 | .01/.22 | .01/.12 | 0 | 15r | 182 | 100 | 220 | 50 |
| | .00/.28 | .00/.28 | .00/.28 | .00/.27 | .00/.23 | .00/.20 | .01/.17 | .01/.11 | 0 | 15r | 455 | 250 | 220 | 50 |
| | .00/.10 | .00/.10 | .00/.10 | .00/.10 | .00/.09 | .00/.09 | .00/.08 | .00/.07 | 0 | 15r | 911 | 500 | 220 | 50 |
| | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.04 | 0 | 15r | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | 100 | 150 | 200 | 600 | 700 | 800 | 900 | 1500 | 28R | 429 | 182 | 100 | 242 | 50 |
| | .95/.94 | .90/.93 | .81/.91 | .21/.53 | .16/.42 | .11/.33 | .11/.26 | .03/.09 | 28R | 429 | 455 | 250 | 242 | 50 |
| | .12/.77 | .17/.76 | .19/.74 | .16/.45 | .15/.38 | .11/.31 | .11/.25 | .03/.09 | 28R | 429 | 911 | 500 | 242 | 50 |
| | .00/.40 | .00/.40 | .00/.39 | .13/.29 | .04/.27 | .05/.24 | .06/.21 | .03/.09 | 28R | 429 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | 1000 | 1300 | 1500 | 2000 | 2300 | 2700 | 3200 | 3800 | 128R | 1439 | 182 | 100 | 439 | 50 |
| | .95/.97 | .85/.90 | .71/.82 | .41/.54 | .32/.41 | .23/.30 | .16/.20 | .11/.16 | 128R | 1439 | 455 | 250 | 439 | 50 |
| | .91/.95 | .78/.87 | .68/.79 | .41/.54 | .32/.41 | .23/.30 | .16/.20 | .11/.16 | 128R | 1439 | 911 | 500 | 439 | 50 |
| | .72/.87 | .62/.78 | .55/.71 | .40/.51 | .32/.41 | .23/.30 | .16/.20 | .11/.16 | 128R | 1439 | 1366 | 750 | 439 | 50 |
| | .46/.76 | .43/.68 | .41/.62 | .34/.47 | .30/.39 | .22/.29 | .16/.20 | .11/.16 | 128R | | | | | |

COVERAGE TABLE

(Distances in meters)

MODERATE DAMAGE TO WHEELED VEHICLES LOW AIRBURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 1000 | | | | | | |
| 3 KT [7-46] | .20/.85 | .24/.79 | .16/.68 | .11/.54 | .06/.40 | .03/.28 | .03/.21 | .03/.11 | 124 | 29r | 182 | 100 | 220 | 50 |
| | .00/.56 | .01/.52 | .03/.46 | .04/.39 | .05/.32 | .05/.25 | .03/.20 | .03/.11 | 124 | 29r | 455 | 250 | 220 | 50 |
| | .00/.23 | .00/.23 | .00/.21 | .00/.20 | .00/.18 | .01/.16 | .01/.14 | .00/.10 | 124 | 29r | 911 | 500 | 220 | 50 |
| | .00/.12 | .00/.12 | .00/.11 | .00/.11 | .00/.11 | .00/.10 | .00/.09 | .00/.08 | 124 | 29r | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | 400 | 550 | 600 | 950 | 1000 | 1200 | 1450 | 1900 | 561 | 637 | 182 | 100 | 242 | 50 |
| | .93/.96 | .80/.89 | .74/.85 | .36/.48 | .31/.43 | .21/.30 | .15/.20 | .08/.12 | 561 | 637 | 455 | 250 | 242 | 50 |
| | .67/.87 | .56/.77 | .53/.74 | .34/.45 | .30/.41 | .21/.29 | .15/.20 | .08/.12 | 561 | 637 | 911 | 500 | 242 | 50 |
| | .11/.58 | .15/.53 | .17/.51 | .20/.37 | .19/.35 | .17/.27 | .14/.20 | .08/.12 | 561 | 637 | 1366 | 750 | 242 | 50 |
| | .00/.37 | .01/.35 | .02/.34 | .15/.27 | .05/.26 | .08/.22 | .09/.17 | .07/.11 | 561 | | | | | |
| 100 KT [11-218] | 1400 | 1900 | 2100 | 2700 | 3000 | 3300 | 4100 | 4900 | 1791 | 1864 | 182 | 100 | 439 | 50 |
| | .95/.97 | .80/.85 | .70/.75 | .45/.50 | .36/.40 | .30/.33 | .18/.22 | .12/.16 | 1791 | 1864 | 455 | 250 | 439 | 50 |
| | .91/.95 | .77/.83 | .69/.75 | .45/.50 | .36/.40 | .30/.33 | .18/.22 | .12/.16 | 1791 | 1864 | 911 | 500 | 439 | 50 |
| | .81/.90 | .66/.77 | .61/.70 | .44/.49 | .36/.40 | .30/.33 | .18/.22 | .12/.16 | 1791 | 1864 | 1366 | 750 | 439 | 50 |
| | .63/.82 | .53/.70 | .50/.64 | .41/.47 | .35/.40 | .30/.33 | .18/.22 | .12/.16 | 1791 | | | | | |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

MODERATE DAMAGE TO TOWED ARTILLERY LOW AIRBURST

| YIELD | EFFECTIVENESS RADIUS OF TARGET | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | 25 | 50 | 75 | 100 | 150 | 175 | 300 | 475 | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | .00/.39 | .00/.39 | .00/.38 | .00/.37 | .00/.33 | .00/.31 | .01/.20 | .01/.10 | 0 | 91 | 182 | 100 | 220 | 50 |
| | .00/.16 | .00/.16 | .00/.16 | .00/.16 | .00/.15 | .00/.15 | .00/.12 | .00/.08 | 0 | 91 | 455 | 250 | 220 | 50 |
| | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.05 | .00/.04 | 0 | 91 | 911 | 500 | 220 | 50 |
| | .00/.02 | .00/.02 | .00/.02 | .00/.02 | .00/.02 | .00/.02 | .00/.02 | .00/.02 | 0 | 91 | 1366 | 750 | 220 | 50 |
| 10 KT [9-80] | .04/.81 | .05/.76 | .03/.67 | .03/.43 | .03/.32 | .03/.24 | .02/.15 | .02/.10 | 60 | 302 | 182 | 100 | 242 | 50 |
| | .00/.57 | .00/.54 | .02/.48 | .03/.35 | .03/.28 | .03/.23 | .02/.14 | .02/.10 | 60 | 302 | 455 | 250 | 242 | 50 |
| | .00/.25 | .00/.25 | .00/.23 | .00/.20 | .00/.18 | .01/.16 | .01/.12 | .02/.09 | 60 | 302 | 911 | 500 | 242 | 50 |
| | .00/.13 | .00/.13 | .00/.13 | .00/.12 | .00/.11 | .00/.10 | .00/.09 | .01/.08 | 60 | 302 | 1366 | 750 | 242 | 50 |
| 100 KT [11-218] | .95/.97 | .83/.91 | .71/.84 | .57/.53 | .30/.43 | .22/.31 | .15/.21 | .10/.15 | 980 | 1143 | 182 | 100 | 430 | 50 |
| | .90/.95 | .74/.86 | .65/.79 | .37/.52 | .30/.43 | .22/.31 | .15/.21 | .10/.15 | 980 | 1143 | 455 | 250 | 430 | 50 |
| | .60/.84 | .51/.74 | .47/.68 | .35/.48 | .29/.41 | .22/.31 | .15/.21 | .10/.15 | 980 | 1143 | 911 | 500 | 430 | 50 |
| | .25/.68 | .28/.60 | .28/.56 | .26/.43 | .24/.37 | .21/.29 | .15/.21 | .10/.15 | 980 | 1143 | 1366 | 750 | 430 | 50 |

SAFETY DISTANCE TABLE (Distances in meters)

TROOP SAFETY (MSD) ----- PRECLUDE (LSD) -----

| YIELD | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED | LT DAM TO | LT ACFT OBSN | IN FLIGHT | | FOREST | | WILDLAND FIRES | | | |
|--------------------|------------------|-------|-------|----------------|-------|------|------------------|------|-------|---------------|-----------|--------------|-----------|-------|--------|----------|----------------|-------|---------|----------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | ASLT | CARGO | BLOWDOWN | DECID | CONIF | CLASS I | CLASS IV |
| 3 KT [7-46] | 5000 | 4700 | 3100 | 3100 | 2800 | 2300 | 3200 | 2900 | 1600* | 800 | 4300 | 4500 | 4900 | 3400 | 2000 | 1400 | 3600 | 2300 | | |
| | 5300 | 5000 | 3500 | 3500 | 3200 | 2600 | 3600 | 3300 | 2000* | 1000 | 4300 | 4500 | 4900 | 3400 | 2100 | 1600 | 3600 | 2300 | | |
| | 6000 | 5700 | 4100 | 4100 | 3900 | 3300 | 4300 | 3900 | 2600* | 1200 | 4500 | 4700 | 5000 | 3600 | 2300 | 1800 | 3800 | 2600 | | |
| | 6700 | 6400 | 4800 | 4800 | 4600 | 4000 | 4900 | 4600 | 3300* | 1200 | 4700 | 4900 | 5200 | 3900 | 2000 | 2000 | 4100 | 2800 | | |
| 10 KT [9-80] | 8300 | 7600 | 5000 | 4800 | 4500 | 3700 | 4500 | 4000 | 1900* | 1200 | 6200 | 7300 | 7700 | 6500 | 3000 | 2200 | 5900 | 3900 | | |
| | 8700 | 8100 | 5400 | 5300 | 5000 | 4100 | 5000 | 4500 | 2300* | 1400 | 6200 | 7300 | 7700 | 6500 | 3000 | 2300 | 5900 | 3900 | | |
| | 9400 | 8800 | 6100 | 6000 | 5700 | 4800 | 5700 | 5200 | 3000* | 1600 | 6300 | 7300 | 7600 | 6500 | 3300 | 2500 | 6000 | 4200 | | |
| | 10100 | 9500 | 6800 | 6700 | 6400 | 5500 | 6400 | 5900 | 3700* | 1800 | 6500 | 7600 | 7900 | 6800 | 3600 | 2800 | 6200 | 4400 | | |
| 100 KT [11-218] | 22100 | 20500 | 12000 | 11400 | 10500 | 7900 | 8800 | 7800 | 3400 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 | | |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 9200 | 8300 | 3800 | 2800 | 12500 | 16900 | 16900 | 16900 | 6800 | 5200 | 14500 | 8900 | | |
| | 23300 | 21600 | 14000 | 12500 | 11600 | 9000 | 9900 | 9000 | 4500 | 3100 | 12500 | 16900 | 16900 | 16900 | 6800 | 5400 | 14500 | 8900 | | |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 10600 | 9700 | 5200 | 3300 | 12500 | 16900 | 16900 | 16900 | 7100 | 5600 | 14500 | 9100 | | |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

MARK 50 BOMB

COVERAGE TABLE

(Distances in meters)

EXPOSED PERSONNEL - IMMEDIATE PERMANENT SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 400 | 600 | 700 | 900 | 1000 | 1100 | 1300 | 1700 | | | | | | |
| 3 KT [7-46] | .95/.97 | .80/.85 | .71/.76 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 628 | 628 | 182 | 100 | 0 | 0 |
| | .68/.87 | .56/.73 | .51/.65 | .42/.49 | .37/.41 | .30/.32 | .20/.22 | .11/.13 | 628 | 628 | 455 | 250 | 0 | 0 |
| | .11/.58 | .17/.50 | .19/.46 | .21/.38 | .21/.34 | .21/.29 | .20/.22 | .10/.12 | 628 | 628 | 911 | 500 | 0 | 0 |
| | .00/.36 | .02/.33 | .02/.31 | .04/.28 | .05/.26 | .07/.23 | .09/.19 | .10/.12 | 628 | 628 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .80/.85 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .16/.18 | .11/.13 | 806 | 806 | 182 | 100 | 0 | 0 |
| | .79/.90 | .64/.76 | .56/.66 | .46/.51 | .40/.42 | .30/.32 | .16/.18 | .11/.13 | 806 | 806 | 455 | 250 | 0 | 0 |
| | .33/.69 | .33/.59 | .32/.52 | .30/.43 | .28/.38 | .25/.31 | .15/.17 | .10/.12 | 806 | 806 | 911 | 500 | 0 | 0 |
| | .04/.48 | .08/.43 | .11/.39 | .14/.34 | .15/.31 | .16/.26 | .15/.17 | .10/.12 | 806 | 806 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .80/.82 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1272 | 1272 | 182 | 100 | 0 | 0 |
| | .90/.95 | .73/.79 | .65/.70 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 1272 | 1272 | 455 | 250 | 0 | 0 |
| | .66/.85 | .54/.70 | .50/.62 | .43/.49 | .38/.42 | .30/.32 | .20/.22 | .11/.13 | 1272 | 1272 | 911 | 500 | 0 | 0 |
| | .37/.71 | .35/.59 | .34/.53 | .32/.44 | .30/.39 | .28/.31 | .20/.22 | .10/.12 | 1272 | 1272 | 1366 | 750 | 0 | 0 |

COVERAGE TABLE

(Distances in meters)

EXPOSED PERSONNEL - IMMEDIATE TRANSIENT SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 500 | 750 | 900 | 1100 | 1250 | 1400 | 1700 | 2100 | | | | | | |
| 3 KT [7-46] | .95/.97 | .83/.87 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 789 | 789 | 182 | 100 | 0 | 0 |
| | .81/.92 | .65/.78 | .57/.67 | .46/.51 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | 789 | 789 | 455 | 250 | 0 | 0 |
| | .31/.70 | .31/.59 | .31/.53 | .30/.44 | .28/.38 | .25/.31 | .20/.22 | .10/.12 | 789 | 789 | 911 | 500 | 0 | 0 |
| | .03/.48 | .07/.43 | .09/.39 | .13/.34 | .14/.31 | .15/.27 | .15/.21 | .10/.12 | 789 | 789 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .81/.86 | .70/.72 | .46/.48 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 997 | 997 | 182 | 100 | 0 | 0 |
| | .86/.93 | .70/.79 | .62/.69 | .45/.47 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 997 | 997 | 455 | 250 | 0 | 0 |
| | .50/.77 | .44/.65 | .42/.58 | .37/.44 | .33/.40 | .28/.32 | .20/.22 | .10/.13 | 997 | 997 | 911 | 500 | 0 | 0 |
| | .17/.59 | .21/.51 | .22/.47 | .23/.38 | .23/.35 | .21/.29 | .19/.22 | .10/.12 | 997 | 997 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .80/.82 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1348 | 1348 | 182 | 100 | 0 | 0 |
| | .90/.94 | .73/.79 | .67/.71 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 1348 | 1348 | 455 | 250 | 0 | 0 |
| | .68/.85 | .56/.70 | .52/.64 | .44/.50 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | 1348 | 1348 | 911 | 500 | 0 | 0 |
| | .41/.72 | .39/.60 | .37/.56 | .34/.45 | .32/.39 | .28/.32 | .20/.22 | .10/.12 | 1348 | 1348 | 1366 | 750 | 0 | 0 |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

EXPOSED PERSONNEL - LATENT SURFACE BURST LETHALITY

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 500 | 1100 | 1250 | 1500 | 1700 | 1900 | 2200 | 2900 | | | | | | |
| 3 KT [7-46] | .95/.97 | .80/.82 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1067 | 1067 | 182 | 100 | 0 | 0 |
| | .95/.97 | .70/.78 | .62/.69 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 1067 | 1067 | 455 | 250 | 0 | 0 |
| | .63/.87 | .47/.65 | .44/.59 | .40/.48 | .35/.41 | .30/.32 | .20/.22 | .10/.13 | 1067 | 1067 | 911 | 500 | 0 | 0 |
| | .18/.68 | .26/.53 | .26/.49 | .26/.41 | .25/.36 | .23/.30 | .20/.22 | .10/.12 | 1067 | 1067 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | 1000 | 1400 | 1550 | 1900 | 2100 | 2400 | 2800 | 3400 | | | | | | |
| | .95/.97 | .80/.82 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .16/.18 | 1322 | 1322 | 182 | 100 | 0 | 0 |
| | .89/.93 | .72/.79 | .66/.71 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .16/.18 | 1322 | 1322 | 455 | 250 | 0 | 0 |
| | .66/.84 | .55/.69 | .51/.63 | .42/.49 | .39/.42 | .30/.32 | .20/.22 | .15/.17 | 1322 | 1322 | 911 | 500 | 0 | 0 |
| 100 KT [11-218] | 1300 | 1800 | 2000 | 2400 | 2700 | 3000 | 3600 | 4400 | | | | | | |
| | .95/.97 | .80/.82 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .16/.18 | 1719 | 1719 | 182 | 100 | 0 | 0 |
| | .91/.95 | .76/.81 | .70/.72 | .50/.52 | .40/.43 | .31/.33 | .21/.23 | .16/.18 | 1719 | 1719 | 455 | 250 | 0 | 0 |
| | .78/.89 | .63/.74 | .58/.67 | .47/.51 | .40/.42 | .30/.32 | .20/.23 | .16/.18 | 1719 | 1719 | 911 | 500 | 0 | 0 |
| | .58/.80 | .49/.67 | .47/.61 | .41/.49 | .37/.41 | .30/.32 | .20/.22 | .15/.17 | 1719 | 1719 | 1366 | 750 | 0 | 0 |

SAFETY DISTANCE TABLE (Distances in meters)

| YIELD | T R O O P S A F E T Y (M S D) | | | | | | | | | | P R E C L U D E (L S D) | | | | | | | | | |
|--------------------|-------------------------------------|-------|-------|----------------|-------|------|------------------|------|-------|------|-----------------------------|----------------|-----------------------|--------------------|-----------------|-----------------------------|---------------------------------|-------|-------|---|
| | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | | MOD DAM FIXED | LT DAM TO BLDG | LT ACFT OBSN UTIL HEL | IN FLIGHT ASLT HEL | OV-1B CARGO HEL | FOREST BLOWDOWN DECID CONIF | WILDLAND FIRES CLASS I CLASS IV | | | |
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | HEL | DECID | CONIF | I |
| 3 KT [7-46] | 4400 | 4100 | 2600 | 2700 | 2500 | 1900 | 2200 | 2000 | 1400* | 700 | 2800 | 4500 | 4900 | 3400 | 1400 | 1000 | 3100 | 1900 | | |
| | 4800 | 4500 | 3000 | 3000 | 2800 | 2300 | 2600 | 2400 | 1800* | 800 | 2900 | 4500 | 4900 | 3400 | 1500 | 1200 | 3100 | 2000 | | |
| | 5400 | 5100 | 3700 | 3700 | 3500 | 3000 | 3200 | 3000 | 2500* | 900 | 3100 | 4700 | 5000 | 3600 | 1400 | 1400 | 3300 | 2200 | | |
| | 6100 | 5800 | 4300 | 4400 | 4200 | 3600 | 3900 | 3700 | 3100* | 900 | 3400 | 4900 | 5200 | 3900 | 1400 | 1500 | 3500 | 2400 | | |
| 10 KT [9-80] | 7500 | 7000 | 4600 | 4500 | 4200 | 3400 | 3300 | 3000 | 1700* | 1100 | 4500 | 7300 | 7700 | 6500 | 2200 | 1600 | 5400 | 3600 | | |
| | 7900 | 7400 | 5000 | 4900 | 4600 | 3800 | 3700 | 3400 | 2100* | 1200 | 4500 | 7300 | 7700 | 6500 | 2300 | 1800 | 5400 | 3500 | | |
| | 8600 | 8100 | 5700 | 5600 | 5300 | 4500 | 4500 | 4100 | 2800* | 1400 | 4700 | 7300 | 7600 | 6500 | 2400 | 2000 | 5500 | 3800 | | |
| | 9400 | 8800 | 6400 | 6300 | 6000 | 5200 | 5200 | 4800 | 3500* | 1600 | 4900 | 7600 | 7900 | 6800 | 2400 | 2200 | 5700 | 4100 | | |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 6800 | 6100 | 2800 | 2300 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 | | |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 7300 | 6500 | 3200 | 2400 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 | | |
| | 23300 | 21600 | 14000 | 12500 | 11600 | 9000 | 8000 | 7200 | 3900 | 2600 | 9700 | 16900 | 16900 | 16900 | 5500 | 4600 | 14500 | 9000 | | |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 8700 | 7900 | 4600 | 2900 | 9800 | 16900 | 16900 | 16900 | 5400 | 4800 | 14500 | 9100 | | |

*Nuclear radiation effects are significant. If troops have history of previous exposure, Consult Figure 15-8 for modification of risk radii.

A FALLOUT PREDICTION SHOULD BE MADE

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN OPEN FOXHOLES - IMMEDIATE PERMANENT SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 200 | 325 | 450 | 600 | 700 | 800 | 900 | 1200 | | | | | | |
| 3 KT [7-46] | .95/.97 | .86/.93 | .71/.78 | .52/.56 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 440 | 440 | 182 | 100 | 0 | 0 |
| | .42/.80 | .40/.71 | .38/.60 | .34/.47 | .31/.39 | .27/.31 | .20/.22 | .10/.12 | 440 | 440 | 455 | 250 | 0 | 0 |
| | .00/.40 | .01/.38 | .03/.34 | .05/.30 | .07/.27 | .09/.24 | .11/.19 | .10/.12 | 440 | 440 | 911 | 500 | 0 | 0 |
| | .00/.22 | .00/.21 | .00/.20 | .00/.19 | .00/.17 | .01/.16 | .02/.14 | .04/.10 | 440 | 440 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .89/.93 | .69/.75 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 579 | 578 | 182 | 100 | 0 | 0 |
| | .65/.86 | .58/.79 | .48/.63 | .42/.49 | .37/.41 | .30/.32 | .20/.22 | .11/.13 | 579 | 578 | 455 | 250 | 0 | 0 |
| | .05/.54 | .09/.51 | .15/.43 | .17/.37 | .18/.33 | .18/.28 | .16/.21 | .10/.12 | 579 | 578 | 911 | 500 | 0 | 0 |
| | .00/.32 | .00/.31 | .02/.28 | .03/.26 | .03/.24 | .04/.21 | .08/.18 | .09/.12 | 579 | 578 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .85/.87 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 847 | 847 | 182 | 100 | 0 | 0 |
| | .80/.90 | .68/.79 | .57/.66 | .46/.51 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | 847 | 847 | 455 | 250 | 0 | 0 |
| | .37/.71 | .36/.62 | .34/.53 | .32/.44 | .31/.39 | .27/.31 | .20/.22 | .10/.12 | 847 | 847 | 911 | 500 | 0 | 0 |
| | .06/.51 | .10/.46 | .14/.41 | .16/.36 | .17/.33 | .17/.28 | .17/.21 | .10/.12 | 847 | 847 | 1366 | 750 | 0 | 0 |

COVERAGE TABLE (Distances in meters)

PERSONNEL IN OPEN FOXHOLES - IMMEDIATE TRANSIENT SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 300 | 500 | 600 | 800 | 900 | 1050 | 1200 | 1600 | | | | | | |
| 3 KT [7-46] | .95/.97 | .85/.90 | .75/.80 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 580 | 580 | 182 | 100 | 0 | 0 |
| | .69/.88 | .56/.76 | .50/.67 | .42/.49 | .37/.41 | .30/.32 | .20/.22 | .11/.13 | 580 | 580 | 455 | 250 | 0 | 0 |
| | .04/.55 | .10/.49 | .13/.45 | .17/.37 | .18/.33 | .18/.28 | .14/.21 | .10/.12 | 580 | 580 | 911 | 500 | 0 | 0 |
| | .00/.33 | .01/.31 | .01/.29 | .03/.26 | .03/.24 | .05/.21 | .07/.18 | .09/.12 | 580 | 580 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .83/.87 | .76/.81 | .50/.52 | .40/.43 | .31/.33 | .21/.23 | .11/.13 | 747 | 747 | 182 | 100 | 0 | 0 |
| | .83/.93 | .64/.78 | .58/.71 | .46/.51 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | 747 | 747 | 455 | 250 | 0 | 0 |
| | .24/.70 | .28/.58 | .28/.53 | .28/.42 | .26/.37 | .25/.31 | .20/.22 | .10/.12 | 747 | 747 | 911 | 500 | 0 | 0 |
| | .02/.46 | .04/.41 | .06/.38 | .10/.33 | .12/.29 | .13/.26 | .14/.20 | .10/.12 | 747 | 747 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .80/.82 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1047 | 1047 | 182 | 100 | 0 | 0 |
| | .88/.94 | .68/.77 | .63/.70 | .48/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 1047 | 1047 | 455 | 250 | 0 | 0 |
| | .55/.80 | .46/.64 | .44/.60 | .39/.47 | .36/.41 | .30/.32 | .20/.22 | .10/.13 | 1047 | 1047 | 911 | 500 | 0 | 0 |
| | .20/.63 | .24/.52 | .25/.49 | .25/.40 | .25/.37 | .22/.30 | .20/.22 | .10/.12 | 1047 | 1047 | 1366 | 750 | 0 | 0 |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN OPEN FOXHOLES - LATENT LETHALITY SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB | | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | MIN RD | EXPT RD | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | 400 | 800 | 900 | 1150 | 1300 | 1500 | 1700 | 2200 | | | | | | |
| | .95/.97 | .83/.87 | .75/.77 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 827 | 827 | 182 | 100 | 0 | 0 |
| | .90/.95 | .66/.78 | .60/.71 | .47/.51 | .40/.42 | .30/.32 | .20/.23 | .11/.13 | 827 | 827 | 455 | 250 | 0 | 0 |
| | .35/.76 | .34/.61 | .34/.56 | .31/.44 | .30/.38 | .26/.31 | .20/.22 | .10/.12 | 827 | 827 | 911 | 500 | 0 | 0 |
| [7-46] | .03/.53 | .09/.45 | .11/.42 | .15/.36 | .16/.32 | .17/.27 | .16/.21 | .10/.12 | 827 | 827 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | 750 | 1050 | 1200 | 1450 | 1650 | 1900 | 2300 | 2900 | | | | | | |
| | .95/.97 | .81/.85 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1038 | 1038 | 182 | 100 | 0 | 0 |
| | .86/.92 | .70/.79 | .62/.69 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 1038 | 1038 | 455 | 250 | 0 | 0 |
| | .53/.78 | .46/.66 | .43/.59 | .40/.48 | .34/.40 | .30/.32 | .20/.22 | .10/.13 | 1038 | 1038 | 911 | 500 | 0 | 0 |
| [9-80] | .20/.61 | .24/.53 | .24/.48 | .25/.41 | .24/.36 | .22/.29 | .20/.22 | .10/.12 | 1038 | 1038 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | 1000 | 1400 | 1600 | 1950 | 2200 | 2400 | 2900 | 3800 | | | | | | |
| | .95/.97 | .83/.87 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1382 | 1382 | 182 | 100 | 0 | 0 |
| | .90/.95 | .75/.81 | .67/.71 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 1382 | 1382 | 455 | 250 | 0 | 0 |
| | .70/.86 | .58/.72 | .53/.64 | .44/.50 | .39/.42 | .30/.32 | .20/.22 | .11/.13 | 1382 | 1382 | 911 | 500 | 0 | 0 |
| [11-218] | .43/.74 | .40/.62 | .38/.56 | .35/.46 | .32/.39 | .30/.32 | .20/.22 | .10/.12 | 1382 | 1382 | 1366 | 750 | 0 | 0 |

SAFETY DISTANCE TABLE (Distances in meters)

| YIELD | T R O O P S A F E T Y (M S D) | | | | | | | | | P R E C L U D E (L S D) | | | | | | | | | |
|--------------------|-------------------------------------|-------|-------|----------------|-------|------|------------------|------|-------|-----------------------------|-----------|--------------|-----------------|-----------------|----------------------|-------|-------|------|--|
| | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED | LT DAM TO | LT ACFT OBSN | IN FLIGHT OV-1B | FOREST BLOWDOWN | WILDLAND FIRES CLASS | | | | |
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | HEL | DECID | CONIF | I | IV | |
| 3 KT [7-46] | 4400 | 4100 | 2600 | 2700 | 2500 | 1900 | 2200 | 2600 | 1400* | 700 | 2800 | 4500 | 4900 | 3400 | 1400 | 1000 | 3100 | 1900 | |
| | 4600 | 4500 | 3000 | 3000 | 2800 | 2300 | 2600 | 2400 | 1800* | 800 | 2900 | 4500 | 4900 | 3400 | 1500 | 1200 | 3100 | 2000 | |
| | 5400 | 5100 | 3700 | 3700 | 3500 | 3000 | 3200 | 3000 | 2500* | 900 | 3100 | 4700 | 5000 | 3600 | 1800 | 1400 | 3300 | 2200 | |
| | 6100 | 5800 | 4300 | 4400 | 4200 | 3600 | 3600 | 3700 | 3100* | 900 | 3400 | 4900 | 5200 | 3900 | 1900 | 1500 | 3500 | 2400 | |
| 10 KT [9-80] | 7500 | 7000 | 4600 | 4500 | 4200 | 3400 | 3300 | 3000 | 1700* | 1100 | 4500 | 7300 | 7700 | 6500 | 2200 | 1600 | 5400 | 3600 | |
| | 7900 | 7400 | 5000 | 4900 | 4600 | 3800 | 3700 | 3400 | 2100* | 1200 | 4500 | 7300 | 7700 | 6500 | 2300 | 1800 | 5400 | 3500 | |
| | 8600 | 8100 | 5700 | 5600 | 5300 | 4500 | 4500 | 4100 | 2800* | 1400 | 4700 | 7300 | 7600 | 6500 | 2600 | 2000 | 5500 | 3800 | |
| | 9400 | 8800 | 6400 | 6300 | 6000 | 5200 | 5200 | 4800 | 3500* | 1600 | 4900 | 7600 | 7900 | 6800 | 2800 | 2200 | 5700 | 4100 | |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 6800 | 6100 | 2800 | 2300 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 | |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 7300 | 6500 | 3200 | 2400 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 | |
| | 23300 | 21600 | 14000 | 12500 | 11600 | 9000 | 8000 | 7200 | 3900 | 2600 | 9700 | 16900 | 16900 | 16900 | 5500 | 4600 | 14500 | 9000 | |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 8700 | 7900 | 4600 | 2900 | 9800 | 16900 | 16900 | 16900 | 5800 | 4800 | 14500 | 9100 | |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

A FALLOUT PREDICTION SHOULD BE MADE

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN TANKS - IMMEDIATE PERMANENT SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 200 | 400 | 500 | 700 | 825 | 900 | 1100 | 1400 | | | | | | |
| 3 KT [7-46] | .95/.97 | .85/.91 | .73/.80 | .50/.52 | .35/.37 | .30/.32 | .21/.23 | .11/.13 | 493 | 493 | 182 | 100 | 0 | 0 |
| | .57/.85 | .47/.73 | .44/.64 | .37/.46 | .32/.36 | .29/.32 | .20/.22 | .10/.13 | 493 | 493 | 455 | 250 | 0 | 0 |
| | .01/.47 | .03/.42 | .05/.39 | .10/.32 | .12/.28 | .13/.25 | .14/.20 | .10/.12 | 493 | 493 | 911 | 500 | 0 | 0 |
| | .00/.26 | .00/.25 | .00/.24 | .01/.21 | .02/.19 | .02/.18 | .04/.16 | .06/.11 | 493 | 493 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .86/.91 | .76/.82 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 637 | 637 | 182 | 100 | 0 | 0 |
| | .70/.88 | .60/.78 | .55/.70 | .43/.49 | .39/.42 | .30/.32 | .20/.22 | .11/.13 | 637 | 637 | 455 | 250 | 0 | 0 |
| | .12/.59 | .16/.53 | .19/.49 | .21/.39 | .21/.35 | .21/.29 | .18/.21 | .10/.12 | 637 | 637 | 911 | 500 | 0 | 0 |
| | .01/.37 | .02/.35 | .02/.33 | .04/.28 | .06/.26 | .07/.23 | .10/.19 | .10/.12 | 637 | 637 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .81/.85 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 900 | 900 | 182 | 100 | 0 | 0 |
| | .84/.93 | .67/.77 | .59/.68 | .48/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 900 | 900 | 455 | 250 | 0 | 0 |
| | .42/.75 | .39/.62 | .37/.55 | .34/.46 | .32/.40 | .28/.32 | .20/.22 | .10/.12 | 900 | 900 | 911 | 500 | 0 | 0 |
| | .09/.55 | .15/.47 | .17/.43 | .18/.38 | .19/.34 | .19/.28 | .18/.22 | .10/.12 | 900 | 900 | 1366 | 750 | 0 | 0 |

COVERAGE TABLE (Distances in meters)

PERSONNEL IN TANKS - IMMEDIATE TRANSIENT SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| | 400 | 600 | 700 | 900 | 1000 | 1100 | 1300 | 1700 | | | | | | |
| 3 KT [7-46] | .95/.97 | .81/.86 | .73/.76 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 635 | 635 | 182 | 100 | 0 | 0 |
| | .70/.87 | .57/.74 | .52/.66 | .43/.49 | .38/.42 | .30/.32 | .20/.22 | .11/.13 | 635 | 635 | 455 | 250 | 0 | 0 |
| | .12/.59 | .18/.51 | .19/.47 | .21/.39 | .21/.35 | .21/.29 | .20/.22 | .10/.12 | 635 | 635 | 911 | 500 | 0 | 0 |
| | .01/.37 | .02/.34 | .03/.32 | .04/.28 | .06/.26 | .07/.23 | .09/.19 | .10/.12 | 635 | 635 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .81/.85 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 805 | 805 | 182 | 100 | 0 | 0 |
| | .79/.90 | .64/.76 | .56/.66 | .46/.51 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | 805 | 805 | 455 | 250 | 0 | 0 |
| | .33/.69 | .33/.59 | .32/.52 | .30/.43 | .28/.38 | .25/.30 | .20/.22 | .10/.12 | 805 | 805 | 911 | 500 | 0 | 0 |
| | .04/.48 | .08/.43 | .11/.39 | .14/.34 | .15/.31 | .16/.26 | .16/.21 | .10/.12 | 805 | 805 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .82/.86 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1093 | 1093 | 182 | 100 | 0 | 0 |
| | .86/.93 | .71/.80 | .64/.70 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 1093 | 1093 | 455 | 250 | 0 | 0 |
| | .56/.79 | .48/.67 | .46/.61 | .40/.48 | .36/.41 | .30/.32 | .20/.22 | .11/.13 | 1093 | 1093 | 911 | 500 | 0 | 0 |
| | .25/.63 | .27/.55 | .27/.50 | .27/.42 | .26/.37 | .24/.30 | .20/.22 | .10/.12 | 1093 | 1093 | 1366 | 750 | 0 | 0 |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

PERSONNEL IN TANKS - LATENT LETHALITY SURFACE BURST

| YIELD | EFFECTIVENESS RADIUS OF TARGET | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | 600 | 900 | 1000 | 1250 | 1400 | 1600 | 1800 | 2400 | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | .95/.97 | .80/.82 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 881 | 881 | 182 | 100 | 0 | 0 |
| | .83/.92 | .65/.76 | .60/.68 | .47/.51 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 881 | 881 | 455 | 250 | 0 | 0 |
| | .41/.73 | .38/.60 | .36/.56 | .33/.45 | .31/.39 | .27/.31 | .20/.22 | .10/.12 | 881 | 881 | 911 | 500 | 0 | 0 |
| | .08/.53 | .14/.46 | .16/.43 | .18/.37 | .18/.33 | .19/.28 | .18/.21 | .10/.12 | 881 | 881 | 1366 | 750 | 0 | 0 |
| 10 KT [9-80] | .95/.97 | .81/.86 | .70/.72 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1090 | 1090 | 182 | 100 | 0 | 0 |
| | .86/.93 | .71/.79 | .64/.70 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | 1090 | 1090 | 455 | 250 | 0 | 0 |
| | .56/.79 | .48/.67 | .45/.60 | .40/.48 | .35/.41 | .30/.32 | .20/.22 | .11/.13 | 1090 | 1090 | 911 | 500 | 0 | 0 |
| | .25/.63 | .27/.55 | .27/.50 | .27/.41 | .26/.36 | .23/.30 | .20/.22 | .10/.12 | 1090 | 1090 | 1366 | 750 | 0 | 0 |
| 100 KT [11-218] | .95/.97 | .80/.82 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | 1411 | 1411 | 182 | 100 | 0 | 0 |
| | .91/.95 | .73/.79 | .68/.72 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | 1411 | 1411 | 455 | 250 | 0 | 0 |
| | .72/.87 | .57/.70 | .54/.65 | .45/.50 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | 1411 | 1411 | 911 | 500 | 0 | 0 |
| | .45/.75 | .41/.61 | .39/.57 | .35/.46 | .33/.40 | .29/.32 | .20/.22 | .10/.12 | 1411 | 1411 | 1366 | 750 | 0 | 0 |

SAFETY DISTANCE TABLE (Distances in meters)

TROOP SAFETY (MSD) ----- PRECLUDE (LSD) -----

| YIELD | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED BRG | LT DAM TO BLDG | LT ACFT OBSN UTIL HEL | IN FLIGHT OV-18 ASLT HEL | CARGO HEL | BLOWDOWN DECID CONIF | WILDLAND FIRES | | |
|--------------------|------------------|-------|-------|----------------|-------|------|------------------|------|-------|----------------------|-------------------|-----------------------------|--------------------------------|--------------|-------------------------|----------------|----------|------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | | | | | | | CLASS I | CLASS IV | |
| 3 KT [7-46] | 4400 | 4100 | 2600 | 2700 | 2500 | 1900 | 2200 | 2000 | 1400* | 700 | 2800 | 4500 | 4900 | 3400 | 1400 | 1000 | 3100 | 1900 |
| | 4800 | 4500 | 3000 | 3000 | 2800 | 2300 | 2600 | 2400 | 1800* | 800 | 2900 | 4500 | 4900 | 3400 | 1500 | 1200 | 3100 | 2000 |
| | 5400 | 5100 | 3700 | 3700 | 3500 | 3000 | 3200 | 3000 | 2500* | 900 | 3100 | 4700 | 5000 | 3600 | 1800 | 1400 | 3300 | 2200 |
| | 6100 | 5800 | 4300 | 4400 | 4200 | 3600 | 3300 | 3700 | 3100* | 900 | 3400 | 4900 | 5200 | 3900 | 1600 | 1500 | 3500 | 2400 |
| 10 KT [9-80] | 7500 | 7000 | 4600 | 4500 | 4200 | 3400 | 3300 | 3000 | 1700* | 1100 | 4500 | 7300 | 7700 | 6500 | 2200 | 1600 | 5400 | 3600 |
| | 7900 | 7400 | 5000 | 4900 | 4600 | 3800 | 3700 | 3400 | 2100* | 1200 | 4500 | 7300 | 7700 | 6500 | 2300 | 1800 | 5400 | 3500 |
| | 8600 | 8100 | 5700 | 5600 | 5300 | 4500 | 4500 | 4100 | 2800* | 1400 | 4700 | 7300 | 7600 | 6500 | 2600 | 2000 | 5500 | 3800 |
| | 9400 | 8800 | 6400 | 6300 | 6000 | 5200 | 5200 | 4800 | 3500* | 1600 | 4900 | 7600 | 7900 | 6800 | 2800 | 2200 | 5700 | 4100 |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 6800 | 6100 | 2800 | 2300 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 7300 | 6500 | 3200 | 2400 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 |
| | 23500 | 21600 | 14000 | 12500 | 11600 | 9000 | 8000 | 7200 | 3900 | 2600 | 9700 | 16900 | 16900 | 16900 | 5500 | 4600 | 14500 | 9000 |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 8700 | 7900 | 4600 | 2900 | 9800 | 16900 | 16900 | 16900 | 5800 | 4800 | 14500 | 9100 |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

A FALLOUT PREDICTION SHOULD BE MADE

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

MODERATE DAMAGE TO TANKS SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | 25 | 150 | 200 | 250 | 300 | 350 | 400 | 600 | 207 | 207 | 182 | 100 | 0 | 0 |
| | .71/.91 | .53/.78 | .47/.68 | .42/.57 | .38/.45 | .32/.36 | .25/.27 | .10/.13 | | | | | | |
| | .00/.38 | .01/.35 | .02/.33 | .03/.30 | .04/.27 | .06/.24 | .08/.21 | .10/.12 | | | | | | |
| | .00/.12 | .00/.12 | .00/.11 | .00/.11 | .00/.11 | .00/.10 | .00/.10 | .00/.08 | | | | | | |
| 10 KT [9-80] | 200 | 150 | 300 | 475 | 550 | 650 | 750 | 1000 | 351 | 351 | 182 | 100 | 0 | 0 |
| | .88/.95 | .93/.96 | .74/.85 | .49/.55 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | | | | | | |
| | .19/.66 | .16/.68 | .24/.58 | .25/.43 | .25/.36 | .22/.29 | .20/.22 | .10/.12 | | | | | | |
| | .00/.28 | .00/.29 | .00/.27 | .11/.23 | .02/.22 | .03/.19 | .05/.17 | .07/.11 | | | | | | |
| 100 KT [11-218] | 700 | 1000 | 1150 | 1450 | 1600 | 1900 | 2300 | 3300 | 1035 | 1035 | 182 | 100 | 0 | 0 |
| | .95/.97 | .85/.87 | .75/.77 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | | | | | | |
| | .87/.94 | .72/.81 | .65/.73 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | | | | | | |
| | .54/.80 | .47/.68 | .44/.61 | .40/.47 | .35/.41 | .30/.32 | .20/.22 | .10/.13 | | | | | | |

COVERAGE TABLE (Distances in meters)

MODERATE DAMAGE TO WHEELED VEHICLES SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | 100 | 200 | 250 | 450 | 500 | 550 | 700 | 900 | 318 | 318 | 182 | 100 | 0 | 0 |
| | .94/.96 | .81/.92 | .74/.86 | .46/.51 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | | | | | | |
| | .05/.64 | .12/.59 | .15/.55 | .21/.39 | .21/.35 | .21/.29 | .19/.22 | .10/.12 | | | | | | |
| | .00/.25 | .00/.24 | .00/.24 | .11/.20 | .01/.19 | .02/.18 | .03/.15 | .06/.11 | | | | | | |
| 10 KT [9-80] | 300 | 450 | 550 | 750 | 850 | 950 | 1200 | 1700 | 544 | 544 | 182 | 100 | 0 | 0 |
| | .95/.97 | .86/.91 | .75/.81 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | | | | | | |
| | .62/.85 | .53/.75 | .48/.67 | .41/.48 | .36/.41 | .30/.32 | .20/.22 | .11/.13 | | | | | | |
| | .03/.51 | .06/.47 | .09/.43 | .14/.35 | .15/.32 | .16/.27 | .16/.21 | .10/.12 | | | | | | |
| 100 KT [11-218] | 1300 | 1600 | 1800 | 2100 | 2400 | 2800 | 3300 | 4100 | 1518 | 1518 | 182 | 100 | 0 | 0 |
| | .90/.92 | .80/.82 | .70/.72 | .51/.53 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | | | | | | |
| | .86/.91 | .75/.80 | .67/.71 | .50/.52 | .40/.42 | .31/.33 | .21/.23 | .11/.13 | | | | | | |
| | .68/.83 | .59/.72 | .54/.65 | .46/.51 | .40/.42 | .30/.32 | .20/.22 | .11/.13 | | | | | | |

MARK 50 BOMB

COVERAGE TABLE (Distances in meters)

MODERATE DAMAGE TO TOWED ARTILLERY SURFACE BURST

| YIELD | EFFECTIVENESS | | | | | | | | PROB MIN RD | EXPT RD | ACCURACY DATA | | | |
|--------------------|------------------|---------|---------|---------|---------|---------|---------|---------|-------------------|------------|---------------|-----|-----|-----|
| | RADIUS OF TARGET | | | | | | | | | | CD/90 | CEP | HOB | PEH |
| 3 KT [7-46] | 25 | 100 | 150 | 250 | 300 | 350 | 450 | 600 | 201 | 201 | 182 | 100 | 750 | 0 |
| | .66/.90 | .56/.84 | .50/.76 | .40/.55 | .36/.44 | .30/.32 | .20/.22 | .10/.13 | | | | | | |
| | .00/.36 | .00/.35 | .00/.33 | .03/.28 | .04/.26 | .05/.22 | .09/.18 | .10/.12 | | | | | | |
| | .00/.11 | .00/.11 | .00/.11 | .00/.11 | .00/.10 | .00/.10 | .00/.09 | .00/.08 | | | | | | |
| 10 KT [9-80] | 100 | 200 | 300 | 475 | 550 | 600 | 700 | 950 | 340 | 340 | 182 | 100 | 750 | 0 |
| | .95/.97 | .86/.94 | .71/.84 | .47/.51 | .40/.42 | .30/.32 | .20/.23 | .11/.13 | | | | | | |
| | .09/.68 | .16/.63 | .21/.56 | .24/.41 | .23/.35 | .22/.30 | .20/.22 | .10/.12 | | | | | | |
| | .00/.28 | .00/.27 | .00/.26 | .01/.22 | .02/.21 | .02/.19 | .04/.16 | .07/.11 | | | | | | |
| 100 KT [11-218] | 700 | 1000 | 1100 | 1400 | 1600 | 1800 | 2300 | 3200 | 1000 | 1000 | 182 | 100 | 750 | 0 |
| | .95/.97 | .82/.86 | .75/.77 | .50/.52 | .41/.43 | .31/.33 | .21/.23 | .11/.13 | | | | | | |
| | .86/.93 | .70/.79 | .65/.73 | .50/.52 | .40/.42 | .30/.32 | .21/.23 | .11/.13 | | | | | | |
| | .51/.78 | .45/.66 | .43/.61 | .39/.47 | .34/.40 | .30/.32 | .20/.22 | .10/.13 | | | | | | |
| | .17/.60 | .22/.52 | .22/.49 | .23/.40 | .23/.35 | .22/.29 | .18/.22 | .10/.12 | 1000 | 1000 | 1366 | 750 | 0 | |

SAFETY DISTANCE TABLE (Distances in meters)

T R O O P S A F E T Y (M S D) ----- P R E C L U D E (L S D) -----

| YIELD | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | MOD DAM FIXED | LT DAM TO | LT ACFT OBSN UTIL | IN FLIGHT OV-1B ASLT CARGO HEL | FOREST BLOWDOWN DECID CONIF | WILDLAND FIRES CLASS I CLASS IV | | | |
|--------------------|------------------|-------|-------|----------------|-------|------|------------------|------|-------|---------------|-----------|-------------------|--------------------------------|-----------------------------|---------------------------------|------|-------|------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | BRG | BLDG | HEL | HEL | HEL | HEL | HEL | HEL | |
| 3 KT [7-46] | 4400 | 4100 | 2600 | 2700 | 2500 | 1900 | 2200 | 2000 | 1400* | 700 | 2800 | 4500 | 4900 | 3400 | 1400 | 1000 | 3100 | 1900 |
| | 4600 | 4500 | 3000 | 3000 | 2800 | 2300 | 2600 | 2400 | 1800* | 800 | 2900 | 4500 | 4900 | 3400 | 1500 | 1200 | 3100 | 2000 |
| | 5400 | 5100 | 3700 | 3700 | 3500 | 3000 | 3200 | 3000 | 2500* | 900 | 3100 | 4700 | 5000 | 3600 | 1800 | 1400 | 3300 | 2200 |
| | 6100 | 5800 | 4300 | 4400 | 4200 | 3600 | 3900 | 3700 | 3100* | 900 | 3400 | 4900 | 5200 | 3900 | 1900 | 1500 | 3500 | 2400 |
| 10 KT [9-80] | 7500 | 7000 | 4600 | 4500 | 4200 | 3400 | 3300 | 3000 | 1700* | 1100 | 4500 | 7300 | 7700 | 6500 | 2200 | 1600 | 5400 | 3600 |
| | 7900 | 7400 | 5000 | 4900 | 4600 | 3800 | 3700 | 3400 | 2100* | 1200 | 4500 | 7300 | 7700 | 6500 | 2300 | 1800 | 5400 | 3500 |
| | 8600 | 8100 | 5700 | 5600 | 5300 | 4500 | 4500 | 4100 | 2800* | 1400 | 4700 | 7300 | 7600 | 6500 | 2600 | 2000 | 5500 | 3800 |
| | 9400 | 8800 | 6400 | 6300 | 6000 | 5200 | 5200 | 4800 | 3500* | 1600 | 4900 | 7600 | 7900 | 6800 | 2800 | 2200 | 5700 | 4100 |
| 100 KT [11-218] | 22100 | 20500 | 12900 | 11400 | 10500 | 7900 | 6800 | 6100 | 2800 | 2300 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 |
| | 22600 | 20900 | 13300 | 11800 | 10900 | 8300 | 7300 | 6500 | 3200 | 2400 | 9700 | 16900 | 16900 | 16900 | 5400 | 4400 | 14500 | 9000 |
| | 23300 | 21600 | 14000 | 12500 | 11600 | 9000 | 8000 | 7200 | 3900 | 2600 | 9700 | 16900 | 16900 | 16900 | 5500 | 4600 | 14500 | 9000 |
| | 24000 | 22300 | 14700 | 13200 | 12300 | 9700 | 8700 | 7900 | 4600 | 2900 | 9900 | 16900 | 16900 | 16900 | 5800 | 4800 | 14500 | 9100 |

*Nuclear radiation effects are significant. If troops have history of previous exposure, consult Figure 15-8 for modification of risk radii.

A FALLOUT PREDICTION SHOULD BE MADE

CHAPTER 12
ATOMIC DEMOLITION MUNITIONS

| | Page |
|---|-------|
| General Information | 12-2 |
| Reaction Time | 12-2 |
| Characteristics of Atomic Demolition Munitions..... | 12-2 |
| Crater Sketch and Nomenclature | 12-3 |
| Buildings, Blast Damage | 12-3 |
| Bridges, Blast Damage | 12-4 |
| Field Fortifications, Blast Damage | 12-4 |
| Military Field Equipment, Blast Damage | 12-5 |
| Tunnel Demolition Tables | 12-6 |
| Bridges and Piers, Demolition | 12-7 |
| Landslide Obstacles | 12-7 |
| Crater Dimensions | 12-8 |
| Overpressures, Radii of | 12-9 |
| Safe Separation Distances | 12-9 |
| Safety, Radii of Personnel | 12-9 |
| Radii of Fire Areas | 12-10 |
| Dose-Distance Tables | 12-11 |
| Damage-Radii Reduction Table | 12-11 |
| Light Aircraft in Flight Safety Table | 12-11 |
| Landmines, Detonation Radii | 12-11 |
| Tree Blowdown Safety Table | 12-11 |

CHAPTER 12

ATOMIC DEMOLITION MUNITIONS

12-1. GENERAL. This chapter contains effects data for use of atomic demolition munitions (ADM) for surface and subsurface emplacement. The major damage producing mechanisms for ADM targets are cratering and ground shock, but air blast often is the governing effect for damage to surface structures and materiel. Several tables show the radii of effects of overpressures on surface structures, while other tables present the radii of safety for personnel from the governing effect. The tables on page 12-8 consider the cratering effects for crater obstacles and, on page 12-7, the crater produced landslide obstacle. The tunnel demolition tables on page 12-6 consider the joint effects of cratering and ground shock. The special ADM target analysis techniques outlined in FM 5-26 should be consulted for additional information.

12-2. SUMMARY OF ATOMIC DEMOLITION MUNITIONS. The principal characteristics of current ADM systems are listed below in Table 12-1.

12-3. EMPLOYMENT CONSIDERATIONS. ADM are normally employed against structures, materiel and terrain features, rather than against personnel. They constitute an expansion to the current family of military explosives for the performance of demolition missions by providing significant reductions in time, manpower and logistical efforts. The fallout potential of ADM must be considered in planning the employment of ADM. Further discussion of ADM fallout considerations are contained in FM 3-12 and FM 5-26.

12-4. REACTION TIME. A reaction time of two hours can be used for initial mission planning, command post exercises, and field training exercises where the handling, preparation, movement and emplacement of an ADM system is directed or simulated. In situations where war reserve or training ADM are physically present, this value can be used for general tactical planning. Where detailed tactical planning is required, the reaction times considered should be those obtained from the ADM delivery unit concerned. The reaction time listed is for an average, reasonably well-trained unit operating under daylight conditions for a surface emplacement without tamping or for installation in a prepared emplacement chamber with favorable weather conditions. Reaction time does not include travel time but only the time required for the performance of required technical operations for the preparation for firing the ADM. Blackout operations, unfavorable weather, enemy interference, equipment breakdown, and faulty test indications will extend the time listed and must be given consideration as part of the tactical planning process when the time of execution is being established. The minimum time that can be set on the timer mechanism must be considered in the scheduling of firing. Travel time to allow emplacing personnel to travel to a safe distance from the detonation must be considered and included. The ADM emplacing unit can compute required timer settings when provided with one or more of the following items of information: desired time of detonation, earliest possible allowable time of detonation, latest allowable time of detonation, time period (span) during which detonation is allowed. The ADM has both a timer and remote firing capability. When using the time option, the time of detonation may be varied in 10 minute increments from 10 minutes to 1 hour and in 30 minute increments to 12 hours.

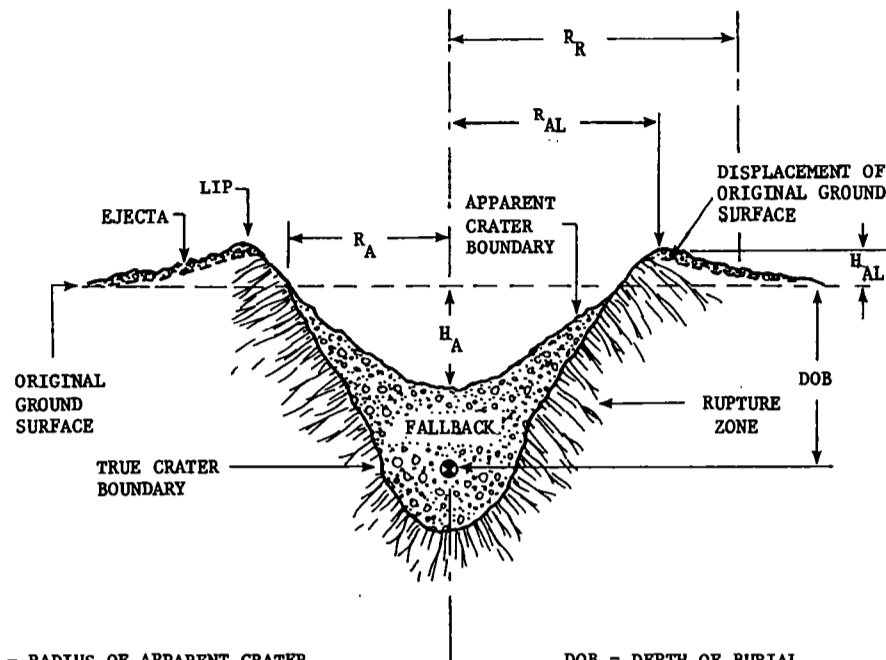
TABLE 12-1 CHARACTERISTICS OF ATOMIC DEMOLITION MUNITIONS

| System | Yield (KT) | Cannister Length (m) | Emplacement Hole Diameter (m) | Transportation Weight (kg) |
|---------|------------|----------------------|-------------------------------|----------------------------|
| W40 Y-1 | 1.0 | 1.52 | 0.76 | 227 |
| W40 Y-2 | 5.0 | 1.52 | 0.76 | 227 |

NOTES:

1. Maximum backfill limitation is 10 meters.
2. For underwater emplacement, depth limitation is 30 meters.

CRATER SKETCH AND NOMENCLATURE



R_A = RADIUS OF APPARENT CRATER

H_A = DEPTH OF APPARENT CRATER

R_R = RADIUS OF RUPTURE ZONE = $1.5 R_A$

V_C = VOLUME OF CRATER = $\pi/2 H_A (R_A)^2$

DOB = DEPTH OF BURIAL

R_{AL} = RADIUS OF APPARENT LIP CREST (OBSTACLE RADIUS) ($1.15 R_A$)

H_{AL} = HEIGHT OF APPARENT LIP CREST = $0.25 H_A$

TABLE 12-2 AIRBLAST DAMAGE RADII FOR BUILDINGS

SURFACE BURST
(Distances in meters)

| Target Description | Degree of Damage | Yield (KT) | |
|--|------------------|------------|------|
| | | 1.0 | 5.0 |
| Multistory blast-resistant reinforced concrete building with reinforced concrete walls, no windows. | Mod | 200 | 345 |
| | Sev | 120 | 215 |
| Multistory reinforced-concrete building with concrete walls, small window areas, three to eight stories. | Mod | 350 | 585 |
| | Sev | 185 | 335 |
| Multistory wall-bearing building, brick apartment house type, up to three stories. | Mod | 555 | 930 |
| | Sev | 345 | 585 |
| Multistory wall-bearing building, monumental type, up to four stories. | Mod | 385 | 600 |
| | Sev | 240 | 405 |
| Wood frame building, house type, one or two stories. | Mod | 775 | 1190 |
| | Sev | 420 | 730 |
| Light steel frame industrial buildings, single-story up to 5-ton crane capacity. | Mod | 435 | 620 |
| | Sev | 160 | 325 |
| Heavy steel frame industrial building, single-story, with 25 to 50 ton crane capacity. | Mod | 310 | 550 |
| | Sev | 145 | 295 |
| Heavy steel frame industrial building, single-story, with 60 to 100 ton crane capacity. | Mod | 255 | 465 |
| | Sev | 135 | 265 |
| Multistory steel frame office-type building, 3 to 10 story, earthquake resistant construction. | Mod | 185 | 315 |
| | Sev | 95 | 165 |
| Multistory steel frame office-type building, 3 to 10 story, non-earthquake resistant construction. | Mod | 240 | 415 |
| | Sev | 120 | 210 |
| Multistory reinforced concrete frame office-type building, 3 to 10 stories, earthquake resistant construction. | Mod | 190 | 335 |
| | Sev | 110 | 195 |
| Multistory reinforced concrete frame office-type building, 3 to 10 stories, non-earthquake resistant construction. | Mod | 230 | 430 |
| | Sev | 120 | 240 |

NOTE: Values presented are for surface bursts only. For subsurface bursts, reduce radii by values given in airblast damage radii reduction table, page 12-11 (Table 12-13).

TABLE 12-3 AIRBLAST DAMAGE RADII FOR BRIDGES

SURFACE BURST
(Distances in meters)

| Target Description | Degree of Damage | Yield (KT) | |
|---|------------------|------------|-----|
| | | 1.0 | 5.0 |
| Highway and railroad truss bridges, spans 60-120 meters. Two-lane hwy, dbl trk, open floor and sgl trk ballast floor, railroad; spans 60-120 meters. Sgl trk, open floor, RR; spans 120 meters. | Mod | 200 | 380 |
| | Sev | 130 | 255 |
| Highway and railroad girder bridges; spans 23 meters. Two-lane deck and through and four-lane deck, highway. Dbl trk deck, open or ballast floor, sgl or dbl trk, through, ballast floor, railroad. | Mod | 135 | 255 |
| | Sev | 100 | 185 |
| Highway and railroad girder bridges; spans 60 meters. Two-lane through and four-lane deck or through, hwy. Dbl trk deck or through, ballast floor, railroad. | Mod | 175 | 325 |
| | Sev | 105 | 200 |
| Highway and railroad girder bridges; spans 60 meters. Two-lane highway. Sgl trk deck or through. Ballast floor and dbl trk deck or through, open floor, railroad. | Mod | 270 | 455 |
| | Sev | 165 | 335 |

NOTE: Values presented are for surface bursts only. For subsurface bursts, reduce radii by values given in airblast damage radii reduction table, page 12-11 (Table 12-13).

TABLE 12-4 AIRBLAST DAMAGE RADII FOR FIELD FORTIFICATIONS

SURFACE BURST
(Distances in meters)

| Target Description | Degree of Damage | Yield (KT) | |
|---|------------------|------------|-----|
| | | 1.0 | 5.0 |
| Command post and personnel shelter, modular sections 1.8m x 2.5m (6 ft by 8 ft) with top 1m to 1.5m (3 ft to 5 ft) below ground surface, earth covered, and covered trench entrance. | Mod | 120 | 205 |
| | Sev | 115 | 195 |
| Machinegun emplacement 2m x 2m (7 ft by 7 ft), framework extends .6m (2 ft) above original ground surface, has open firing ports and open trench entrance, 1m to 1.5m (3 ft to 5 ft) mound of earth covers framework and extends down to the ground surface except at openings. | Mod | 175 | 300 |
| | Sev | 160 | 270 |
| Firing port facing away from ground zero | Mod | 140 | 240 |
| | Sev | 135 | 225 |
| Unrevetted trenches and foxholes with or without light cover. | Mod | 285 | 485 |
| | Sev | 220 | 375 |
| Wire entanglements: Double apron barbed wire | Sev | 220 | 420 |
| | Concertina | 235 | 615 |

NOTE: Values presented are for surface bursts only. For subsurface bursts, reduce radii by values given in airblast damage radii reduction table, page 12-11 (Table 12-13).

TABLE 12-5 AIRBLAST DAMAGE RADII FOR MILITARY FIELD EQUIPMENT
SURFACE BURST
(Distances in meters)

| Target Description | Degree of Damage | Yield (KT) | |
|---|------------------|------------|-----|
| | | 1.0 | 5.0 |
| Tracked Vehicles | Mod | 155 | 295 |
| | Sev | 95 | 185 |
| Artillery | Mod | 160 | 300 |
| | Sev | 135 | 260 |
| Wheeled Vehicles and Armored Personnel Carriers (APC) | Mod | 215 | 405 |
| | Sev | 145 | 275 |
| Supply Dumps | Sev | 90 | 175 |
| Radio-Fire Control Equipment | Sev | 200 | 385 |
| Open-grid-radar-antenna | Sev | 505 | 965 |
| Railroad rolling stock | Mod | 225 | 385 |
| End-on orientation | Sev | 210 | 355 |
| Railroad rolling stock | Mod | 295 | 565 |
| Side-on orientation | Sev | 240 | 455 |
| Railroad locomotives | Mod | 160 | 275 |
| End-on orientation | Sev | 100 | 170 |
| Railroad locomotives | Mod | 195 | 370 |
| 45° orientation | Sev | 100 | 185 |
| Railroad locomotives | Mod | 200 | 375 |
| Sid-on orientation | Sev | 110 | 210 |
| Engineer earth-moving equipment in open | Mod | 285 | 545 |
| | Sev | 175 | 335 |
| Engineer earth-moving equipment, shielded | Mod | 160 | 310 |
| | Sev | 140 | 265 |
| Jet fighter aircraft (random orientation) | Mod | 175 | 300 |
| | Sev | 140 | 240 |
| Jet bomber aircraft (random orientation) | Mod | 340 | 585 |
| | Sev | 305 | 520 |
| Propeller Transports (random orientation) | Mod | 380 | 650 |
| | Sev | 340 | 585 |
| Helicopters (random orientation) | Mod | 455 | 780 |
| | Sev | 400 | 690 |

NOTE: Values presented are for surface bursts only. For subsurface bursts, reduce radii by values given in airblast damage radii reduction table, page 12-11 (Table 12-13).

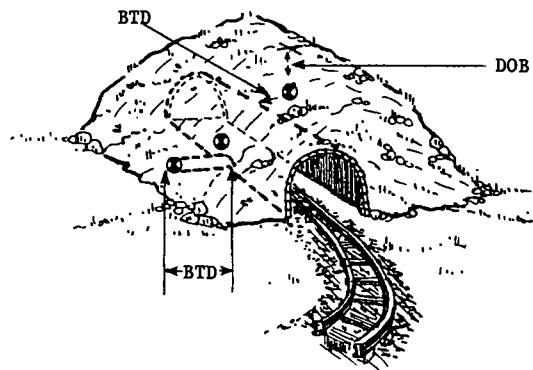


FIGURE NOTES

1. Burst to Tunnel Distance (BTD) is the distance from the ADM to the nearest point on the wall of the tunnel.
2. The Burst to Tunnel Distance (BTD) is 0 when the ADM is placed anywhere inside the main tunnel.

TABLE 12-6 TUNNEL DEMOLITION TABLES
 MINIMUM YIELD (KT) ADM REQUIRED TO EXTEND DAMAGE FOR 30 METERS
 WITHIN A TUNNEL THROUGH A DRY HARD ROCK MEDIUM.

SEVERE DAMAGE*

| Burst to Tunnel Distance (meters) | Depths of Burst (m) | | | | | | | | | | |
|-----------------------------------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 15 |
| 15 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 25 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 30 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 35 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 40 | 5.0 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 45 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 50 | ** | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 |
| 55 | ** | ** | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| 60 | ** | ** | ** | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |

*Considered destroyed. Requires standard tunneling procedures to repair. Dislodged material completely fills the tunnel opening.

**Thirty meters damage not achievable.

MODERATE DAMAGE***

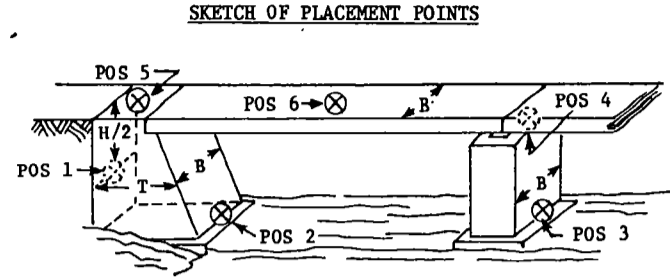
| Burst to Tunnel Distance (meters) | Depths of Burst (m) | | | | | | | | | | |
|-----------------------------------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 15 |
| 15 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 25 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 30 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 35 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 40 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 45 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 50 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 55 | 5.0 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 60 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 1.0 | 1.0 | 1.0 | 1.0 |

***Significant rehabilitation required to repair. Tunnel may be passable on foot without recovery work.

DEMOLITION OF BRIDGES AND PIERS

POSITIONING OF THE ADM

| Position | Location |
|----------|----------------------------|
| 1 | Behind Abutment (buried) |
| 2 | Face of Abutment |
| 3 | Base of Pier |
| 4 | Top of Pier, under roadway |
| 5 | Top of Abutment |
| 6 | Center of Span |



POSITION 1

| Abutment Thickness (meters) (T) | Maximum Abutment Width (B) That Can be Demolished (meters) | |
|---------------------------------|--|------|
| | Yield (KT) | |
| | 1.0 | 5.0 |
| 2 | 72 | >100 |
| 5 | 84 | >100 |
| 10 | 96 | >100 |
| 15 | >100 | >100 |

POSITION 2

| | Maximum Abutment Width (B) and Thickness (T) That Can be Demolished (meters) | |
|---------------|--|-------|
| | Yield (KT) | |
| | 1.0 | 5.0 |
| Thickness (T) | 14.6 | 25.0 |
| Width (B) | 60.0 | 100.0 |

NOTE: Maximum abutment width increases as the abutment thickness increases. This is due to enhancement of cratering effects as the depth of burial (thickness of abutment) increases.

POSITIONS 3, 4, 5 or 6

Maximum Abutment, Pier or Roadway Width That can be Demolished (meters)

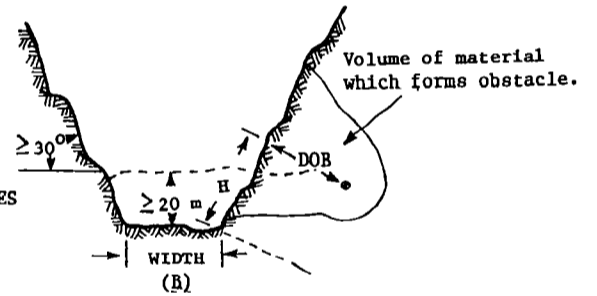
| | Yield (KT) | |
|-------|------------|-------|
| | 1.0 | 5.0 |
| Width | 60.0 | 100.0 |

LANDSLIDE OBSTACLES

(Distances in meters)

CRATERING ON SIDES OF HILLS AND MOUNTAIN PASSES

DEPTH OF BURIAL INTO THE HILLSIDE
(PERPENDICULAR TO VALLEY WALL)



| YIELD (KT) | DEFILE WIDTH (B) | | | | | | | | | | | | | |
|------------|------------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
| 5.0 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 8 | 11 | 15 | 20 | 28 | 38 | - |
| 1.0 | 7 | 8 | 10 | 14 | 17 | 25 | 35 | - | - | - | - | - | - | - |

**MINIMUM EMPLACEMENT HEIGHT (H) ABOVE THE VALLEY FLOOR TO PRODUCE THE DESIRED LANDSLIDE
(MEASURED PARALLEL TO VALLEY WALL)**

| YIELD (KT) | DOB (Into the Hillside) | | | | | | | | | | | | | | |
|------------|-------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| | 0 | 1 | 2 | 3 | 4 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | |
| 5.0 | 22 | 28 | 31 | 33 | 35 | 36 | 42 | 45 | 49 | 51 | 53 | 54 | 56 | 57 | |
| 1.0 | 13 | 19 | 21 | 22 | 24 | 25 | 29 | 32 | 33 | 35 | 36 | 36 | 36 | 37 | |

NOTES:

1. Valley walls must make an angle with the valley floor of 30° or more.
2. After determination of yield and DOB required, the minimum emplacement height above the valley floor must be determined. Enter first table with yield in KT and width of the defile in meters to obtain the burial depth measured perpendicular to the side of the defile. Use this burial depth and the yield to enter the second table and obtain the distance up the side of the defile from the bottom to the point where the burial hole is to be dug. This distance should be greater than the DOB shown on sketch.
3. Use of these tables will result in the production of an obstacle with heights of 20 or more meters with side slopes of greater than 30° across the width of the valley. See Sketch.

TABLE 12-7 APPARENT CRATER DIMENSIONS

YIELD 1.0 KT

| DEPTH OF BURST | CRATER RADIUS DRY SOIL | RADIUS OF RUPTURE ZONE DRY SOIL | CRATER DEPTH DRY SOIL | CRATER RADIUS DRY ROCK | RADIUS OF RUPTURE ZONE DRY ROCK | CRATER DEPTH DRY ROCK | CRATER RADIUS WET SOIL | RADIUS OF RUPTURE ZONE WET SOIL | CRATER DEPTH WET SOIL | CRATER RADIUS WET ROCK | RADIUS OF RUPTURE ZONE WET ROCK | CRATER DEPTH WET ROCK |
|----------------|------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|-----------------------|
| -5 | 4 | 6 | 2 | 0 | 0 | 0 | 8 | 11 | 3 | 2 | 3 | 1 |
| -4 | 5 | 9 | 3 | 1 | 1 | 0 | 9 | 14 | 4 | 4 | 6 | 2 |
| -3 | 7 | 11 | 4 | 3 | 5 | 1 | 11 | 17 | 5 | 6 | 9 | 4 |
| -2 | 10 | 15 | 4 | 6 | 9 | 3 | 14 | 21 | 6 | 9 | 13 | 5 |
| -1 | 13 | 20 | 5 | 9 | 13 | 4 | 18 | 27 | 8 | 12 | 18 | 6 |
| 0 | 19 | 28 | 9 | 15 | 22 | 7 | 25 | 37 | 9 | 18 | 27 | 9 |
| 1 | 26 | 39 | 12 | 22 | 33 | 9 | 30 | 46 | 12 | 26 | 38 | 11 |
| 2 | 31 | 46 | 14 | 25 | 37 | 11 | 33 | 50 | 14 | 29 | 44 | 13 |
| 3 | 34 | 50 | 14 | 27 | 40 | 12 | 35 | 53 | 16 | 31 | 47 | 14 |
| 4 | 35 | 53 | 15 | 28 | 42 | 13 | 37 | 55 | 17 | 33 | 49 | 15 |
| 5 | 36 | 54 | 16 | 29 | 44 | 14 | 38 | 57 | 18 | 34 | 51 | 16 |
| 10 | 40 | 60 | 20 | 35 | 52 | 18 | 45 | 67 | 22 | 40 | 60 | 20 |
| 15 | 42 | 64 | 23 | 39 | 58 | 21 | 50 | 76 | 26 | 44 | 66 | 24 |
| 20 | 44 | 66 | 26 | 42 | 63 | 23 | 55 | 83 | 29 | 47 | 70 | 27 |
| 25 | 45 | 68 | 28 | 44 | 66 | 25 | 59 | 89 | 31 | 49 | 74 | 30 |
| 30 | 46 | 70 | 30 | 46 | 68 | 26 | 62 | 93 | 33 | 51 | 76 | 31 |
| 35 | 47 | 71 | 30 | 46 | 69 | 27 | 63 | 95 | 33 | 52 | 78 | 32 |
| 40 | 48 | 72 | 29 | 45 | 68 | 26 | 64 | 95 | 33 | 52 | 78 | 32 |
| 45 | 48 | 72 | 28 | 43 | 64 | 23 | 63 | 94 | 31 | 52 | 77 | 31 |
| 50 | 48 | 73 | 26 | 37 | 56 | 18 | 62 | 93 | 29 | 51 | 76 | 28 |
| 55 | 48 | 72 | 24 | 23 | 35 | 8 | 60 | 90 | 27 | 48 | 73 | 25 |
| 60 | 48 | 72 | 21 | 0 | 0 | 0 | 59 | 88 | 24 | 43 | 64 | 14 |

YIELD 5.0 KT

| DEPTH OF BURST | CRATER RADIUS DRY SOIL | RADIUS OF RUPTURE ZONE DRY SOIL | CRATER DEPTH DRY SOIL | CRATER RADIUS DRY ROCK | RADIUS OF RUPTURE ZONE DRY ROCK | CRATER DEPTH DRY ROCK | CRATER RADIUS WET SOIL | RADIUS OF RUPTURE ZONE WET SOIL | CRATER DEPTH WET SOIL | CRATER RADIUS WET ROCK | RADIUS OF RUPTURE ZONE WET ROCK | CRATER DEPTH WET ROCK |
|----------------|------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|-----------------------|------------------------|---------------------------------|-----------------------|
| -5 | 13 | 19 | 6 | 6 | 9 | 2 | 10 | 29 | 4 | 11 | 16 | 6 |
| -4 | 15 | 23 | 7 | 8 | 13 | 4 | 22 | 33 | 10 | 13 | 20 | 8 |
| -3 | 18 | 28 | 7 | 11 | 17 | 5 | 25 | 37 | 11 | 16 | 25 | 9 |
| -2 | 22 | 33 | 8 | 14 | 21 | 7 | 29 | 43 | 13 | 20 | 30 | 10 |
| -1 | 26 | 39 | 11 | 18 | 27 | 9 | 35 | 53 | 14 | 24 | 35 | 12 |
| 0 | 32 | 48 | 15 | 26 | 38 | 11 | 43 | 64 | 16 | 30 | 45 | 15 |
| 1 | 38 | 57 | 18 | 32 | 48 | 13 | 46 | 69 | 18 | 38 | 57 | 16 |
| 2 | 44 | 66 | 21 | 37 | 56 | 16 | 50 | 75 | 21 | 43 | 64 | 18 |
| 3 | 49 | 73 | 22 | 40 | 59 | 17 | 53 | 79 | 23 | 46 | 69 | 20 |
| 4 | 52 | 78 | 23 | 41 | 62 | 18 | 55 | 82 | 24 | 49 | 73 | 21 |
| 5 | 54 | 81 | 23 | 43 | 65 | 19 | 57 | 85 | 26 | 51 | 76 | 22 |
| 10 | 60 | 91 | 27 | 50 | 75 | 24 | 64 | 96 | 31 | 57 | 86 | 27 |
| 15 | 64 | 96 | 31 | 55 | 82 | 28 | 70 | 106 | 35 | 63 | 94 | 31 |
| 20 | 66 | 99 | 35 | 59 | 88 | 32 | 76 | 114 | 39 | 67 | 101 | 35 |
| 25 | 68 | 103 | 38 | 63 | 94 | 34 | 82 | 123 | 42 | 71 | 107 | 39 |
| 30 | 70 | 106 | 41 | 66 | 99 | 37 | 87 | 130 | 45 | 74 | 111 | 42 |
| 35 | 72 | 107 | 43 | 69 | 103 | 39 | 91 | 137 | 48 | 77 | 115 | 45 |
| 40 | 73 | 109 | 45 | 71 | 106 | 40 | 95 | 142 | 50 | 79 | 118 | 47 |
| 45 | 74 | 111 | 47 | 72 | 109 | 42 | 98 | 146 | 52 | 81 | 121 | 49 |
| 50 | 75 | 112 | 48 | 73 | 110 | 42 | 100 | 150 | 53 | 82 | 123 | 51 |
| 55 | 76 | 114 | 48 | 74 | 111 | 43 | 101 | 152 | 53 | 83 | 124 | 52 |
| 60 | 76 | 114 | 48 | 73 | 110 | 42 | 102 | 153 | 53 | 83 | 125 | 52 |
| 65 | 77 | 115 | 47 | 72 | 108 | 41 | 102 | 153 | 52 | 83 | 125 | 52 |
| 70 | 77 | 116 | 46 | 70 | 105 | 39 | 101 | 152 | 51 | 83 | 125 | 51 |
| 75 | 77 | 116 | 44 | 66 | 99 | 35 | 100 | 151 | 49 | 82 | 124 | 48 |
| 80 | 78 | 116 | 42 | 60 | 90 | 30 | 99 | 149 | 47 | 81 | 122 | 45 |
| 85 | 78 | 116 | 40 | 50 | 75 | 21 | 98 | 147 | 44 | 80 | 119 | 40 |
| 90 | 78 | 116 | 37 | 26 | 39 | 6 | 96 | 144 | 42 | 77 | 115 | 34 |
| 95 | 77 | 116 | 34 | 0 | 0 | 0 | 95 | 142 | 39 | 71 | 106 | 25 |

NOTE: Dry soil has 10% or less moisture content and less than 50% saturation.
 Dry rock has 3% or less moisture content and less than 50% saturation.
 Linear interpolation is permitted for depths of burial not shown.
 To obtain obstacle diameter, multiply apparent crater radius by 2.3.

TABLE 12-8 RADII OF OVERPRESSURES
(Distances in meters)

| YIELD 1.0 KT | | | | | YIELD 5.0 KT | | | | |
|-----------------|------|-----|-----|-----|-----------------|------|------|-----|-----|
| DOB (meters) | PSI | | | | DOB (meters) | PSI | | | |
| | 1 | 3 | 6 | 10 | | 1 | 3 | 6 | 10 |
| 0 | 1170 | 600 | 415 | 300 | 0 | 3050 | 1160 | 780 | 540 |
| 1 | 1150 | 575 | 400 | 290 | 1 | 2975 | 1120 | 755 | 520 |
| 2 | 1130 | 545 | 385 | 275 | 2 | 2895 | 1095 | 735 | 505 |
| 3 | 1080 | 525 | 370 | 265 | 3 | 2820 | 1060 | 715 | 490 |
| 4 | 1040 | 505 | 350 | 255 | 4 | 2745 | 1025 | 685 | 470 |
| 5 | 990 | 480 | 335 | 240 | 5 | 2675 | 995 | 665 | 455 |
| 6 | 945 | 460 | 320 | 225 | 6 | 2610 | 970 | 645 | 440 |
| 7 | 905 | 440 | 300 | 215 | 7 | 2535 | 940 | 625 | 425 |
| 8 | 870 | 420 | 285 | 205 | 8 | 2470 | 910 | 600 | 410 |
| 9 | 830 | 400 | 275 | 195 | 9 | 2400 | 885 | 580 | 390 |
| 10 | 800 | 385 | 265 | 180 | 10 | 2335 | 855 | 560 | 375 |
| 12 | 725 | 350 | 235 | 165 | 12 | 2220 | 805 | 525 | 350 |
| 14 | 665 | 320 | 215 | 150 | 14 | 2105 | 755 | 490 | 320 |
| 18 | 560 | 265 | 175 | 120 | 16 | 2000 | 705 | 455 | 290 |
| 20 | 515 | 235 | 160 | 110 | 18 | 1895 | 665 | 425 | 270 |
| 25 | 405 | 190 | 120 | 85 | 20 | 1795 | 625 | 390 | 250 |
| | | | | | 25 | 1575 | 525 | 330 | 200 |
| | | | | | 30 | 1385 | 440 | 265 | 150 |
| | | | | | 32 | 1320 | 405 | 245 | 140 |
| | | | | | 34 | 1255 | 370 | 225 | 125 |
| | | | | | 40 | 1060 | 300 | 175 | 80 |

NOTE: Linear interpolation is permitted for depths of burst not shown.

TABLE 12-9 SAFE SEPARATION DISTANCES OF ADM FROM ANOTHER ADM
FOR MULTIPLE DETONATIONS
(Distances in meters)

| DOB | SEPARATE DETONATION | SIMULTANEOUS DETONATION |
|-----|------------------------|----------------------------|
| 0 | 1000 | 500 |
| 2 | 1000 | 150 |
| 5 | 1000 | 170 |
| 10 | 1000 | 195 |
| 20 | 1000 | 230 |
| 30 | 1000 | 260 |
| 40 | 1000 | 285 |
| 50 | 1000 | 300 |
| 60 | 1000 | 310 |
| 80 | 500 | 300 |
| 100 | 500 | 280 |

TABLE 12-10 RADII OF SAFETY TABLES
(Distances in meters)

| DOB | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | |
|-----|------------------|-------|-------|----------------|-------|-------|------------------|-------|-------|
| | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER |
| | RISK | RISK | RISK | RISK | RISK | RISK | RISK | RISK | RISK |
| 0 | 1800T | 1670T | 1110R | 1190R | 1170R | 1110R | 980R | 890R | 740R |
| 1 | 1680T | 1650T | 940R | 1130T | 1000R | 940R | 1050M | 870M | 700M |
| 3 | 1700M | 1400M | 980T | 1700M | 1400M | 970M | 1700M | 1400M | 970M |
| 5 | 1610M | 1320M | 930T | 1610M | 1320M | 830M | 1610M | 1320M | 830M |
| 7 | 1600M | 1240M | 1000S | 1600M | 1240M | 1000S | 1600M | 1240M | 1000S |
| 10 | 1660S | 1660S | 1660S | 1660S | 1660S | 1660S | 1660S | 1660S | 1660S |
| 15 | 1930S | 1930S | 1930S | 1930S | 1930S | 1930S | 1930S | 1930S | 1930S |
| 20 | 2090S | 2090S | 2090S | 2090S | 2090S | 2090S | 2090S | 2090S | 2090S |
| 25 | 2330S | 2330S | 2330S | 2330S | 2330S | 2330S | 2330S | 2330S | 2330S |
| 30 | 2320S | 2320S | 2320S | 2320S | 2320S | 2320S | 2320S | 2320S | 2320S |
| 50 | 1400S | 1400S | 1400S | 1400S | 1400S | 1400S | 1400S | 1400S | 1400S |
| 65 | 900S* | 900S* | 900S* | 900S* | 900S* | 900S* | 900S* | 900S* | 900S* |

Governing Effects: B - BLAST; M - EJECTA MISSILES; R - NUCLEAR RADIATION; S - BASE SURGE; T - THERMAL RADIATION

*Missile effects data not available.

TABLE 12-10 RADII OF SAFETY TABLES (Cont)

(Distances in meters)

5.0 KT

| DOB | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | |
|-----|------------------|----------|-----------|----------------|----------|-----------|------------------|----------|-----------|
| | NEG RISK | MOD RISK | EMER RISK | NEG RISK | MOD RISK | EMER RISK | NEG RISK | MOD RISK | EMER RISK |
| 0 | 5410T | 5010T | 3130T | 3085T | 2840T | 2210T | 2195B | 1930B | 1425B |
| 1 | 5200T | 4805T | 2995T | 2950T | 2725T | 2105T | 2155B | 1885B | 1380B |
| 3 | 4760T | 4400T | 2740T | 2895T | 2490T | 1935T | 2425M | 1905M | 1550M |
| 5 | 4320T | 3990T | 2480T | 2890M | 2390T | 1985M | 2890M | 1970M | 1985M |
| 7 | 4120T | 3587T | 2430M | 3180M | 2605M | 2430M | 3180M | 2605M | 2430M |
| 10 | 4100M | 3425M | 2375M | 4100M | 3425M | 2375M | 4100M | 3425M | 2375M |
| 15 | 3660M | 3135M | 2790S | 3660M | 3135M | 2790S | 3660M | 3135M | 2790S |
| 20 | 4380S | 4380S | 4380S | 4380S | 4380S | 4380S | 4380S | 4380S | 4380S |
| 30 | 5430S | 5430S | 5430S | 5430S | 5430S | 5430S | 5430S | 5430S | 5430S |
| 65 | 4585S | 4585S | 4585S | 4585S | 4585S | 4585S | 4585S | 4585S | 4585S |
| 100 | 2305S | 2305S | 2305S | 2305S | 2305S | 2305S | 2305S | 2305S | 2305S |

Governing Effects: B - BLAST; M - EJECTA MISSILES; R - NUCLEAR RADIATION; S - BASE SURGE; T - THERMAL RADIATION

If nuclear radiation effects govern and troops have a history of previous exposure, consult Figure 15-8 for modification of risk radii.

TABLE 12-11 RADII OF FIRE AREAS
SURFACE AND SUBSURFACE BURSTS
(Radii in meters: Relative humidity - 50%)

| YIELD (KT) | DEPTH OF BURST | DRY FOREST FLOOR | GREEN FOREST FLOOR | WHOLESALE BUSINESS BUILDING | RETAIL BUSINESS BUILDING | POOR HOMES | MEDIUM HOMES |
|------------|----------------|------------------|--------------------|-----------------------------|--------------------------|------------|--------------|
| 1.0 | 0 | 1065 | 630 | 315 | 280 | 350 | 300 |
| | 5 | 720 | 425 | 215 | 190 | 240 | 205 |
| | 10 | 375 | 220 | 110 | 100 | 125 | 105 |
| | 15 | 30 | 115 | 10 | 10 | 10 | 10 |
| | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.0 | 0 | 2330 | 1490 | 770 | 675 | 860 | 735 |
| | 5 | 1860 | 1190 | 615 | 540 | 685 | 585 |
| | 10 | 1390 | 890 | 460 | 400 | 510 | 435 |
| | 15 | 920 | 590 | 305 | 265 | 340 | 290 |
| | 20 | 450 | 285 | 150 | 130 | 165 | 140 |
| | 25 | 0 | 0 | 0 | 0 | 0 | 0 |

NOTE: Linear interpolation is permitted for depths of burst not shown.
Data source is study, Evaluation of Nuclear Weapons Thermal Threat, prepared by Stanford Research Institute, Menlo Park, CA, August 1966.
Poor homes are considered to have wood siding, tarred roofs, windows with flammable curtains, flammable rubbish in yards, close proximity to neighboring houses and high population density.
Medium homes are assumed to have brick siding, roofs of asbestos and tar shingles with surface of crushed stones, heavy drapes and/or venetian blinds on windows, trees shading houses and windows, 10 meters or more between houses and lower population density.

TABLE 12-12 DOSE-DISTANCE TABLES

(Distances in meters)

| EXPOSED PERSONNEL | | | PERSONNEL IN FOXHOLES | | |
|-------------------|----------|------|-----------------------|----------|------|
| YIELD (KT) | 1.0 | 5.0 | YIELD (KT) | 1.0 | 5.0 |
| DOSE (RAD) | DISTANCE | | DOSE (RAD) | DISTANCE | |
| 5 | 1620 | 2680 | 5 | 1350 | 2290 |
| 10 | 1550 | 2520 | 10 | 1220 | 2110 |
| 15 | 1410 | 2400 | 15 | 1150 | 2010 |
| 20 | 1360 | 2320 | 20 | 1100 | 1920 |
| 25 | 1310 | 2260 | 25 | 1060 | 1860 |
| 30 | 1280 | 2210 | 30 | 1030 | 1820 |
| 35 | 1250 | 2170 | 35 | 1010 | 1780 |
| 40 | 1220 | 2130 | 40 | 990 | 1750 |
| 45 | 1200 | 2100 | 45 | 960 | 1710 |
| 50 | 1180 | 2070 | 50 | 940 | 1680 |
| 60 | 1150 | 2020 | 60 | 910 | 1640 |
| 70 | 1120 | 1980 | 70 | 890 | 1600 |
| 80 | 1100 | 1940 | 80 | 860 | 1570 |
| 90 | 1080 | 1910 | 90 | 850 | 1540 |
| 100 | 1060 | 1890 | 100 | 830 | 1510 |

NOTES:

1. Data apply only to surface bursts.
2. Calculations were made with troop safety yield.
3. Recommend that closest table dose and/or distance be used; DO NOT INTERPOLATE.

TABLE 12-13 MISCELLANEOUS ADM TABLES

(Distances in meters)

AIR BLAST DAMAGE-RADII REDUCTION FOR SURFACE STRUCTURES

| DOB (meters) | YIELD (KT) | |
|-----------------|------------|-----|
| | 1.0 | 5.0 |
| 1 | 10 | 10 |
| 2 | 20 | 15 |
| 3 | 30 | 25 |
| 4 | 45 | 40 |
| 5 | 60 | 50 |
| 6 | 90 | 65 |
| 7 | 105 | 80 |
| 8 | 120 | 100 |
| 9 | * | 120 |
| 10 | * | 145 |
| 12 | * | 180 |
| 14 | * | * |

NOTE: To determine the damage radius to target elements damaged from the airblast effects as a result of subsurface detonations, the distances given in this table must be subtracted from the blast damage radius for surface bursts. Should the results be a negative number, or should the reduction distance be shown as an asterisk, consider the damage radius to be zero.

RADII OF LAND MINE DETONATION VULNERABILITY (10% INCIDENCE)
SURFACE BURSTS

| MINE TYPE | YIELD (KT) | |
|-----------|------------|------|
| | 1.0 | 5.0 |
| Anti-Tank | 245 | 495 |
| Anti-Pers | 680 | 1530 |

NOTE: For subsurface bursts, reduce radii by values given in airblast damage radii reduction table above.

SAFETY DISTANCES FOR LIGHT AIRCRAFT IN FLIGHT
SURFACE BURSTS

| YIELD (KT) | OBS & UTIL HEL | ATTACK HEL | CARGO HEL & OV-1B |
|------------|----------------|------------|-------------------|
| 1.0 | 1755 | 1910 | 1350 |
| 5.0 | 4420 | 4710 | 3665 |

PRECLUDE TREE BLOWDOWN
SURFACE BURSTS

| Yield (KT) | DECIDUOUS | CONIFEROUS |
|------------|-----------|------------|
| 1.0 | 500 | 360 |
| 5.0 | 1300 | 910 |

CHAPTER 13
WEAPON EFFECTS TABLES

| | | Page |
|---------------------|----------------|-------|
| Short Range Cannon | 0.2 KT | 13-2 |
| Short Range Cannon | 1.0 KT | 13-4 |
| Medium Range Cannon | 2.0 KT | 13-6 |
| Medium Range Cannon | 8.0 KT | 13-8 |
| Free Flight Rocket | 5.0 KT | 13-10 |
| Free Flight Rocket | 20.0 KT | 13-12 |
| Guided Missile | 10.0 KT | 13-14 |
| Guided Missile | 50.0 KT | 13-16 |
| Guided Missile | 100.0 KT | 13-18 |
| MARK 50 Bomb | 3.0 KT | 13-20 |
| MARK 50 Bomb | 10.0 KT | 13-22 |
| MARK 50 Bomb | 100.0 KT | 13-24 |

SHORT RANGE CANNON

.2 KT
(3-10)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|---------|-------|------|------------------|-------|------|----------|-------|------|----------|-------|------|-------------------|-------|------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH |
| 600 | 0 | 0 | 170 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| 570 | 0 | 0 | 230 | 0 | 0 | 0 | 0 | 0 | 160 | 0 | 0 | 0 | 0 | 0 | 0 |
| 540 | 0 | 0 | 280 | 0 | 0 | 0 | 0 | 0 | 220 | 0 | 0 | 0 | 0 | 0 | 0 |
| 510 | 0 | 0 | 320 | 0 | 0 | 0 | 0 | 0 | 260 | 0 | 0 | 90 | 0 | 0 | 0 |
| 480 | 0 | 0 | 350 | 0 | 0 | 40 | 0 | 0 | 300 | 0 | 0 | 170 | 0 | 0 | 0 |
| 450 | 0 | 50 | 380 | 0 | 0 | 140 | 0 | 0 | 340 | 0 | 0 | 220 | 0 | 0 | 0 |
| 420 | 0 | 140 | 400 | 0 | 0 | 190 | 0 | 70 | 360 | 0 | 0 | 260 | 0 | 0 | 0 |
| 390 | 0 | 190 | 430 | 0 | 0 | 230 | 0 | 140 | 390 | 0 | 0 | 290 | 0 | 0 | 0 |
| 360 | 0 | 230 | 440 | 0 | 0 | 260 | 0 | 190 | 410 | 0 | 40 | 320 | 0 | 0 | 0 |
| 330 | 100* | 260 | 460 | 0 | 0 | 290 | 40* | 220 | 430 | 0 | 120 | 340 | 0 | 0 | 0 |
| 300 | 150* | 280 | 480 | 0 | 100 | 310 | 110* | 250 | 440 | 0 | 160 | 360 | 0 | 0 | 10 |
| 270 | 180* | 300 | 490 | 0 | 140 | 330 | 150* | 270 | 460 | 40* | 200 | 380 | 0 | 0 | 90 |
| 240 | 210* | 320 | 500 | 30* | 170 | 350 | 180* | 290 | 470 | 100* | 220 | 390 | 0 | 0 | 140 |
| 210 | 230* | 330 | 510 | 90* | 200 | 360 | 210* | 310 | 480 | 140* | 240 | 400 | 0 | 0 | 160 |
| 180 | 240* | 340 | 520 | 120* | 220 | 370 | 220* | 320 | 490 | 160* | 260 | 410 | 0 | 0 | 190 |
| 150 | 260* | 350 | 520 | 140* | 230 | 380 | 240* | 330 | 490 | 180* | 270 | 420 | 0 | 30 | 200 |
| 120 | 260* | 360 | 520 | 160* | 240 | 380 | 240* | 330 | 490 | 190* | 270 | 420 | 0 | 70 | 210 |
| 90 | 270* | 360 | 520 | 170* | 240 | 380 | 250* | 330 | 490 | 200* | 280 | 420 | 0 | 80 | 220 |
| 60 | 260* | 350 | 510 | 170* | 240 | 380 | 250* | 330 | 480 | 200* | 270 | 410 | 40 | 90 | 220 |
| 30 | 250* | 340 | 490 | 160* | 230 | 360 | 240* | 320 | 470 | 190* | 260 | 400 | 40* | 90 | 210 |
| 1 | 230* | 310 | 460 | 130* | 210 | 330 | 210* | 290 | 430 | 160* | 240 | 370 | 30* | 70 | 190 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY BRICK APT FACTORIES | | | |
|-----|---------------------------|-------|------|-------------------------|-------|------|------------------|---------|------------------|------|------------|---------------------------------|-------|-------|-------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | SUMMER | WINTER | EXPO | SHLD | | TANKS | WOOD | WOOD | FACT- |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | UNIFORM | UNIFORM | | | | | FRAME | STORY | ORIES |
| 600 | 0 | 0 | 90 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 570 | 0 | 0 | 180 | 0 | 0 | 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 540 | 0 | 0 | 230 | 0 | 0 | 230 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 510 | 0 | 0 | 280 | 0 | 0 | 280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 480 | 0 | 0 | 310 | 0 | 0 | 320 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 450 | 0 | 0 | 350 | 0 | 0 | 350 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 420 | 0 | 90 | 370 | 0 | 80 | 370 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 390 | 0 | 150 | 400 | 0 | 150 | 400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 360 | 0 | 200 | 420 | 0 | 190 | 420 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 330 | 50* | 230 | 440 | 80 | 230 | 440 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | |
| 300 | 120* | 260 | 450 | 130 | 260 | 450 | 0 | 0 | 0 | 0 | 0 | 130 | 0 | 0 | |
| 270 | 160* | 280 | 470 | 180 | 280 | 470 | 0 | 0 | 0 | 0 | 0 | 180 | 0 | 0 | |
| 240 | 190* | 300 | 480 | 260 | 300 | 480 | 0 | 0 | 0 | 0 | 0 | 260 | 120 | 0 | |
| 210 | 210* | 310 | 490 | 330 | 330 | 490 | 60 | 0 | 0 | 0 | 0 | 330 | 150 | 0 | |
| 180 | 280 | 330 | 490 | 350 | 350 | 490 | 100 | 60 | 0 | 0 | 0 | 350 | 280 | 0 | |
| 150 | 280 | 330 | 500 | 340 | 340 | 500 | 130 | 90 | 0 | 0 | 0 | 340 | 280 | 0 | |
| 120 | 260 | 340 | 500 | 320 | 340 | 500 | 150 | 120 | 40 | 40 | 0 | 320 | 260 | 0 | |
| 90 | 250* | 340 | 500 | 290 | 340 | 500 | 160 | 130 | 70 | 70 | 30 | 290 | 230 | 0 | |
| 60 | 250* | 330 | 490 | 270 | 330 | 490 | 170 | 150 | 90 | 70 | 60 | 270 | 210 | 60 | |
| 30 | 240* | 320 | 470 | 240 | 320 | 470 | 180 | 150 | 90 | 70 | 70 | 240 | 190 | 70 | |
| 1 | 220* | 290 | 440 | 220 | 290 | 440 | 140 | 110 | 70 | 70 | 50 | 220 | 180 | 50 | |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

SHORT RANGE CANNON

.2 KT

(3-10)

EFFECTS TABLES

(Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | | HOB |
|----------------------|-------------------|-----------------|-------|----------------|----------|------------------|-----|------|----------------|-----|------|------------------|-----|------|-----|-----|
| I-PSI OVER-PRES-SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | | |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | | |
| 640 | 0 | 0 | 0 | 190 | 0 | 900 | 790 | 510 | 700 | 650 | 510 | 470 | 410 | 240 | 600 | |
| 660 | 0 | 0 | 0 | 250 | 0 | 920 | 810 | 540 | 720 | 670 | 540 | 500 | 440 | 290 | 570 | |
| 690 | 0 | 0 | 0 | 290 | 0 | 930 | 820 | 560 | 740 | 690 | 560 | 520 | 470 | 330 | 540 | |
| 710 | 0 | 0 | 0 | 330 | 0 | 940 | 840 | 580 | 760 | 700 | 580 | 550 | 490 | 360 | 510 | |
| 730 | 0 | 0 | 0 | 360 | 0 | 960 | 850 | 600 | 770 | 720 | 600 | 570 | 510 | 390 | 480 | |
| 760 | 0 | 0 | 0 | 390 | 0 | 970 | 870 | 620 | 790 | 730 | 620 | 590 | 530 | 420 | 450 | |
| 790 | 0 | 0 | 0 | 410 | 0 | 980 | 880 | 630 | 800 | 750 | 630 | 620 | 550 | 440 | 420 | |
| 810 | 0 | 0 | 0 | 430 | 0 | 990 | 890 | 650 | 810 | 760 | 650 | 650 | 570 | 460 | 390 | |
| 860 | 0 | 0 | 0 | 450 | 70 | 1000 | 900 | 660 | 820 | 770 | 660 | 680 | 580 | 480 | 360 | |
| 1110 | 0 | 0 | 0 | 470 | 130 | 1000 | 910 | 670 | 830 | 780 | 670 | 750 | 600 | 500 | 330 | |
| 1130 | 0 | 0 | 0 | 490 | 180 | 1010 | 920 | 680 | 840 | 790 | 680 | 790 | 690 | 510 | 300 | |
| 1130 | 0 | 0 | 0 | 500 | 210 | 1020 | 920 | 690 | 850 | 800 | 690 | 950 | 720 | 520 | 270 | |
| 1110 | 0 | 0 | 0 | 510 | 230 | 1020 | 930 | 700 | 850 | 810 | 700 | 950 | 810 | 530 | 240 | |
| 1080 | 0 | 330 | 0 | 520 | 250 | 1030 | 930 | 710 | 860 | 810 | 710 | 930 | 810 | 540 | 210 | |
| 1030 | 0 | 370 | 0 | 530 | 270 | 1030 | 940 | 710 | 860 | 810 | 710 | 900 | 780 | 550 | 180 | |
| 970 | 0 | 360 | 230 | 540 | 280 | 1040 | 940 | 710 | 860 | 810 | 710 | 850 | 750 | 550 | 150 | |
| 910 | 0 | 330 | 210 | 540 | 290 | 1040 | 950 | 710 | 860 | 810 | 710 | 800 | 700 | 550 | 120 | |
| 830 | 100 | 300 | 190 | 550 | 300 | 1040 | 950 | 710 | 850 | 810 | 710 | 730 | 650 | 550 | 90 | |
| 760 | 120 | 270 | 170 | 550 | 310 | 1050 | 950 | 700 | 840 | 790 | 700 | 670 | 630 | 540 | 60 | |
| 680 | 110 | 250 | 160 | 550 | 310 | 1050 | 950 | 680 | 820 | 770 | 680 | 650 | 610 | 520 | 30 | |
| 600 | 90 | 180 | 150 | 410 | 230 | 790 | 730 | 630 | 770 | 730 | 630 | 610 | 570 | 480 | 1 | |

SEVERE DAMAGE

| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
|---------|------|---------------|-------------------------|-------|--------------------|-------|-----------------------------|---------|------------------------|---------------------|-----------------------------|------|--------------------------|------|-----|
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 600 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 570 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 540 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 510 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 480 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 450 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 420 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 390 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 330 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300 |
| 0 | 0 | 0 | 0 | 0 | 0 | 70 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 270 |
| 0 | 0 | 0 | 0 | 0 | 0 | 110 | 110 | 450 | 0 | 0 | 0 | 0 | 0 | 0 | 240 |
| 0 | 0 | 0 | 20 | 0 | 0 | 140 | 150 | 450 | 0 | 320 | 0 | 0 | 0 | 0 | 210 |
| 0 | 0 | 0 | 60 | 0 | 0 | 260 | 250 | 420 | 0 | 340 | 0 | 0 | 0 | 0 | 180 |
| 0 | 0 | 0 | 80 | 20 | 0 | 260 | 240 | 390 | 20 | 330 | 0 | 0 | 0 | 0 | 150 |
| 0 | 0 | 0 | 100 | 40 | 30 | 230 | 220 | 360 | 60 | 310 | 0 | 0 | 0 | 30 | 120 |
| 0 | 0 | 0 | 100 | 70 | 60 | 220 | 200 | 330 | 90 | 290 | 10 | 10 | 0 | 50 | 90 |
| 50 | 60 | 20 | 100 | 80 | 80 | 200 | 180 | 300 | 100 | 260 | 50 | 50 | 0 | 80 | 60 |
| 50 | 60 | 40 | 100 | 80 | 80 | 180 | 160 | 270 | 100 | 240 | 60 | 40 | 0 | 80 | 30 |
| 40 | 40 | 10 | 90 | 70 | 60 | 160 | 150 | 240 | 90 | 210 | 40 | 40 | 0 | 50 | 1 |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

SHORT RANGE CANNON 1 KT (5-24)

EFFECTS TABLES (Distances in meters)

| PERSONNEL CASUALTIES | | | | | | | | | | | | | | | |
|----------------------|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 600 | 0 | 220 | 580 | 0 | 0 | 290 | 0 | 110 | 520 | 0 | 0 | 370 | 0 | 0 |
| 670 | 0 | 280 | 610 | 0 | 0 | 340 | 0 | 200 | 550 | 0 | 0 | 410 | 0 | 0 | 0 |
| 640 | 0 | 330 | 630 | 0 | 0 | 380 | 0 | 270 | 580 | 0 | 0 | 450 | 0 | 0 | 0 |
| 610 | 110* | 370 | 660 | 0 | 0 | 420 | 0 | 320 | 600 | 0 | 140 | 480 | 0 | 0 | 0 |
| 480 | 190* | 410 | 680 | 0 | 90 | 450 | 120* | 360 | 630 | 0 | 210 | 510 | 0 | 0 | 0 |
| 450 | 250* | 440 | 700 | 0 | 180 | 480 | 190* | 390 | 650 | 0 | 260 | 530 | 0 | 0 | 60 |
| 420 | 290* | 460 | 720 | 0 | 230 | 500 | 240* | 420 | 670 | 70* | 300 | 550 | 0 | 0 | 160 |
| 390 | 330* | 490 | 730 | 0 | 270 | 520 | 290* | 450 | 680 | 150* | 340 | 570 | 0 | 0 | 210 |
| 360 | 360* | 510 | 750 | 120* | 310 | 540 | 320* | 470 | 700 | 210* | 370 | 590 | 0 | 0 | 250 |
| 330 | 380* | 530 | 760 | 180* | 340 | 560 | 350* | 490 | 710 | 250* | 390 | 610 | 0 | 0 | 290 |
| 300 | 410* | 540 | 770 | 220* | 360 | 580 | 370* | 510 | 720 | 280* | 410 | 620 | 0 | 50 | 320 |
| 270 | 420* | 560 | 780 | 250* | 380 | 590 | 390* | 520 | 740 | 300* | 430 | 640 | 0 | 120 | 340 |
| 240 | 440* | 570 | 790 | 280* | 400 | 600 | 410* | 530 | 740 | 330* | 450 | 650 | 0 | 170 | 360 |
| 210 | 450* | 580 | 800 | 300* | 410 | 610 | 420* | 550 | 750 | 340* | 460 | 650 | 70* | 200 | 370 |
| 180 | 460* | 590 | 800 | 310* | 420 | 620 | 430* | 550 | 760 | 360* | 470 | 660 | 110* | 220 | 390 |
| 150 | 470* | 590 | 800 | 320* | 430 | 620 | 440* | 560 | 760 | 370* | 480 | 660 | 140* | 230 | 390 |
| 120 | 470* | 590 | 800 | 330* | 440 | 620 | 440* | 560 | 760 | 370* | 480 | 660 | 150* | 250 | 400 |
| 90 | 470* | 590 | 790 | 330* | 430 | 620 | 440* | 560 | 750 | 370* | 480 | 660 | 160* | 250 | 400 |
| 60 | 460* | 580 | 780 | 330* | 430 | 610 | 440* | 550 | 740 | 370* | 470 | 650 | 160* | 250 | 390 |
| 30 | 450* | 560 | 760 | 320* | 410 | 590 | 420* | 530 | 720 | 350* | 460 | 630 | 150* | 240 | 380 |
| 1 | 410* | 520 | 710 | 290* | 380 | 550 | 390* | 490 | 680 | 320* | 420 | 590 | 130* | 220 | 350 |

| PERSONNEL CASUALTIES | | | | | | | | | | | | | | | | MODERATE DAMAGE | | | | SEVERE DAMAGE | | |
|----------------------|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|-------|------------|-----------------|-----------|-----------------------|-----------------|--|--|--|---------------|--|--|
| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | | | | | MULTI STORY FACTORIES | | | | | | | |
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | TANKS | TOWED ARTY | WOOD FRAME BLDG | BRICK APT | FACTORIES | | | | | | | |
| | 600 | 0 | 140 | 540 | 210 | 210 | 540 | 0 | 0 | 0 | 0 | 0 | 0 | 210 | 0 | 0 | | | | | | |
| 570 | 0 | 220 | 570 | 280 | 280 | 570 | 0 | 0 | 0 | 0 | 0 | 0 | 280 | 0 | 0 | | | | | | | |
| 540 | 0 | 280 | 590 | 360 | 360 | 600 | 0 | 0 | 0 | 0 | 0 | 0 | 360 | 0 | 0 | | | | | | | |
| 510 | 0 | 330 | 620 | 440 | 440 | 630 | 0 | 0 | 0 | 0 | 0 | 0 | 440 | 0 | 0 | | | | | | | |
| 480 | 140* | 370 | 640 | 520 | 520 | 650 | 0 | 0 | 0 | 0 | 0 | 0 | 520 | 0 | 0 | | | | | | | |
| 450 | 240* | 400 | 660 | 590 | 590 | 670 | 60 | 0 | 0 | 0 | 0 | 0 | 590 | 240 | 0 | | | | | | | |
| 420 | 280 | 430 | 680 | 660 | 660 | 690 | 150 | 0 | 0 | 0 | 0 | 0 | 660 | 280 | 0 | | | | | | | |
| 390 | 320 | 460 | 700 | 720 | 720 | 720 | 210 | 70 | 0 | 0 | 0 | 0 | 720 | 320 | 0 | | | | | | | |
| 360 | 410 | 480 | 710 | 760 | 760 | 760 | 250 | 150 | 0 | 0 | 0 | 0 | 760 | 410 | 0 | | | | | | | |
| 330 | 580 | 580 | 730 | 760 | 760 | 760 | 290 | 200 | 0 | 0 | 0 | 0 | 760 | 580 | 0 | | | | | | | |
| 300 | 600 | 600 | 740 | 750 | 750 | 750 | 320 | 240 | 0 | 0 | 0 | 0 | 750 | 600 | 0 | | | | | | | |
| 270 | 590 | 590 | 750 | 740 | 740 | 750 | 340 | 270 | 0 | 0 | 0 | 0 | 740 | 590 | 0 | | | | | | | |
| 240 | 580 | 580 | 760 | 720 | 720 | 760 | 360 | 290 | 0 | 0 | 0 | 0 | 720 | 580 | 0 | | | | | | | |
| 210 | 550 | 550 | 760 | 700 | 700 | 770 | 380 | 310 | 100 | 100 | 0 | 0 | 700 | 580 | 0 | | | | | | | |
| 180 | 520 | 560 | 770 | 670 | 670 | 770 | 390 | 330 | 160 | 160 | 20 | 0 | 670 | 550 | 0 | | | | | | | |
| 150 | 500 | 570 | 770 | 640 | 640 | 780 | 400 | 340 | 190 | 180 | 110 | 50 | 640 | 520 | 190 | | | | | | | |
| 120 | 470 | 570 | 770 | 620 | 620 | 770 | 410 | 350 | 210 | 170 | 150 | 110 | 620 | 500 | 170 | | | | | | | |
| 90 | 450* | 560 | 760 | 590 | 590 | 770 | 420 | 360 | 220 | 160 | 180 | 140 | 590 | 470 | 170 | | | | | | | |
| 60 | 440* | 560 | 750 | 560 | 560 | 760 | 420 | 370 | 230 | 160 | 180 | 160 | 560 | 450 | 190 | | | | | | | |
| 30 | 430* | 540 | 730 | 520 | 540 | 740 | 380 | 330 | 210 | 160 | 170 | 160 | 520 | 430 | 190 | | | | | | | |
| 1 | 390 | 500 | 690 | 480 | 500 | 690 | 330 | 280 | 180 | 160 | 130 | 120 | 480 | 390 | 150 | | | | | | | |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

SHORT RANGE CANNON 1 KT (5-24)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 1790 | 0 | 0 | 0 | 1210 | 540 | 2320 | 2140 | 1150 | 1230 | 1090 | 880 | 1360 | 1070 | 630 | 600 |
| 2130 | 0 | 0 | 0 | 1230 | 570 | 2330 | 2150 | 1170 | 1250 | 1100 | 900 | 1450 | 1110 | 650 | 570 |
| 2170 | 0 | 0 | 0 | 1240 | 600 | 2340 | 2150 | 1180 | 1260 | 1120 | 920 | 1490 | 1150 | 680 | 540 |
| 2180 | 0 | 0 | 0 | 1250 | 620 | 2340 | 2160 | 1200 | 1270 | 1130 | 940 | 1740 | 1340 | 700 | 510 |
| 2180 | 0 | 0 | 0 | 1260 | 640 | 2350 | 2170 | 1210 | 1280 | 1150 | 950 | 1920 | 1370 | 720 | 480 |
| 2170 | 0 | 0 | 0 | 1270 | 660 | 2360 | 2170 | 1220 | 1290 | 1160 | 970 | 1940 | 1490 | 740 | 450 |
| 2150 | 0 | 0 | 0 | 1280 | 680 | 2360 | 2180 | 1230 | 1300 | 1170 | 980 | 1940 | 1560 | 750 | 420 |
| 2120 | 0 | 0 | 0 | 1290 | 700 | 2370 | 2180 | 1240 | 1310 | 1180 | 990 | 1920 | 1570 | 770 | 390 |
| 2080 | 0 | 780 | 0 | 1300 | 710 | 2370 | 2190 | 1250 | 1320 | 1190 | 1000 | 1900 | 1560 | 780 | 360 |
| 2030 | 0 | 830 | 0 | 1310 | 730 | 2380 | 2190 | 1260 | 1330 | 1200 | 1010 | 1760 | 1540 | 800 | 330 |
| 1970 | 0 | 830 | 510 | 1320 | 740 | 2380 | 2200 | 1260 | 1330 | 1200 | 1020 | 1720 | 1500 | 810 | 300 |
| 1910 | 0 | 820 | 550 | 1320 | 750 | 2380 | 2200 | 1270 | 1340 | 1210 | 1030 | 1670 | 1470 | 820 | 270 |
| 1840 | 150 | 790 | 540 | 1330 | 760 | 2390 | 2210 | 1280 | 1350 | 1220 | 1030 | 1610 | 1420 | 820 | 240 |
| 1760 | 300 | 760 | 510 | 1330 | 770 | 2390 | 2210 | 1280 | 1350 | 1220 | 1040 | 1550 | 1370 | 830 | 210 |
| 1680 | 280 | 720 | 470 | 1340 | 780 | 2390 | 2210 | 1280 | 1360 | 1230 | 1040 | 1480 | 1310 | 830 | 180 |
| 1600 | 260 | 680 | 460 | 1340 | 780 | 2390 | 2210 | 1290 | 1360 | 1230 | 1040 | 1410 | 1250 | 840 | 150 |
| 1510 | 260 | 640 | 440 | 1340 | 790 | 2400 | 2220 | 1290 | 1360 | 1230 | 1040 | 1330 | 1180 | 830 | 120 |
| 1430 | 280 | 600 | 410 | 1350 | 790 | 2400 | 2220 | 1290 | 1360 | 1240 | 1030 | 1260 | 1110 | 830 | 90 |
| 1340 | 270 | 570 | 390 | 1350 | 790 | 2400 | 2220 | 1300 | 1370 | 1240 | 1010 | 1180 | 1040 | 820 | 60 |
| 1250 | 250 | 540 | 380 | 1200 | 700 | 2170 | 2000 | 1150 | 1220 | 1110 | 990 | 1100 | 970 | 800 | 30 |
| 1170 | 230 | 510 | 370 | 1040 | 600 | 1920 | 1770 | 1000 | 1110 | 1050 | 940 | 1020 | 900 | 750 | 1 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|--|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB | |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 600 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 570 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 540 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 510 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 140 | 0 | 0 | 0 | 0 | 0 | 0 | 480 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 200 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 450 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 250 | 260 | 0 | 0 | 0 | 0 | 0 | 0 | 420 | |
| 0 | 0 | 0 | 0 | 10 | 0 | 0 | 290 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 390 | |
| 0 | 0 | 0 | 0 | 40 | 0 | 0 | 330 | 350 | 0 | 710 | 0 | 0 | 0 | 0 | 360 | |
| 0 | 0 | 0 | 0 | 130 | 0 | 0 | 560 | 540 | 0 | 750 | 0 | 0 | 0 | 0 | 330 | |
| 0 | 0 | 0 | 0 | 160 | 0 | 0 | 580 | 530 | 0 | 750 | 0 | 0 | 0 | 0 | 300 | |
| 0 | 0 | 0 | 0 | 130 | 40 | 0 | 580 | 520 | 10 | 740 | 0 | 0 | 0 | 0 | 270 | |
| 0 | 0 | 0 | 0 | 210 | 80 | 0 | 560 | 500 | 800 | 720 | 0 | 0 | 0 | 40 | 240 | |
| 0 | 0 | 0 | 0 | 230 | 110 | 100 | 530 | 480 | 760 | 690 | 0 | 0 | 0 | 90 | 210 | |
| 0 | 0 | 0 | 0 | 250 | 130 | 160 | 510 | 450 | 720 | 660 | 0 | 0 | 0 | 120 | 180 | |
| 0 | 0 | 0 | 0 | 250 | 160 | 190 | 490 | 430 | 680 | 640 | 60 | 60 | 0 | 150 | 150 | |
| 130 | 150 | 70 | 260 | 170 | 210 | 210 | 470 | 400 | 650 | 610 | 110 | 110 | 30 | 190 | 120 | |
| 140 | 160 | 90 | 250 | 190 | 220 | 220 | 450 | 380 | 610 | 580 | 140 | 120 | 60 | 210 | 90 | |
| 140 | 160 | 110 | 240 | 190 | 230 | 230 | 420 | 360 | 570 | 540 | 150 | 110 | 90 | 220 | 60 | |
| 120 | 140 | 110 | 230 | 160 | 210 | 210 | 400 | 350 | 540 | 510 | 140 | 110 | 100 | 170 | 30 | |
| 100 | 120 | 60 | 210 | 150 | 180 | 180 | 370 | 330 | 510 | 480 | 110 | 110 | 70 | 140 | 1 | |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

MEDIUM RANGE CANNON

2 KT

(6-38)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 400 | 70* | 450 | 240 | 0 | 0 | 510 | 0 | 370 | 760 | 0 | 100 | 590 | 0 | 0 |
| 470 | 200* | 500 | 270 | 0 | 10 | 560 | 60* | 430 | 790 | 0 | 210 | 630 | 0 | 0 | 0 |
| 540 | 280* | 540 | 290 | 0 | 160 | 590 | 190* | 470 | 820 | 0 | 290 | 660 | 0 | 0 | 0 |
| 510 | 340* | 580 | 320 | 0 | 250 | 630 | 260* | 510 | 850 | 0 | 350 | 690 | 0 | 0 | 120 |
| 480 | 390* | 610 | 340 | 0 | 310 | 660 | 320* | 550 | 870 | 110* | 400 | 720 | 0 | 0 | 210 |
| 450 | 430* | 640 | 360 | 60* | 360 | 690 | 370* | 580 | 890 | 200* | 440 | 750 | 0 | 0 | 280 |
| 420 | 470* | 670 | 380 | 160* | 400 | 710 | 410* | 610 | 910 | 260* | 480 | 770 | 0 | 0 | 330 |
| 390 | 500* | 690 | 400 | 230* | 440 | 740 | 450* | 640 | 930 | 310* | 510 | 790 | 0 | 0 | 370 |
| 360 | 530* | 720 | 420 | 280* | 470 | 760 | 480* | 660 | 950 | 350* | 540 | 810 | 0 | 50 | 410 |
| 330 | 560* | 730 | 430 | 320* | 500 | 770 | 510* | 680 | 960 | 390* | 560 | 830 | 0 | 140 | 440 |
| 300 | 580* | 750 | 440 | 350* | 520 | 790 | 530* | 700 | 970 | 420* | 580 | 840 | 0 | 190 | 470 |
| 270 | 600* | 770 | 450 | 380* | 540 | 800 | 550* | 720 | 990 | 440* | 600 | 860 | 40* | 240 | 490 |
| 240 | 610* | 780 | 460 | 410* | 560 | 820 | 570* | 730 | 1000 | 460* | 620 | 870 | 110* | 270 | 510 |
| 210 | 620* | 790 | 470 | 420* | 570 | 830 | 580* | 740 | 1000 | 480* | 630 | 880 | 160* | 300 | 520 |
| 180 | 630* | 790 | 470 | 440* | 580 | 830 | 590* | 750 | 1010 | 490* | 640 | 880 | 190* | 320 | 530 |
| 150 | 640* | 800 | 480 | 450* | 590 | 840 | 600* | 750 | 1010 | 500* | 640 | 890 | 210* | 330 | 540 |
| 120 | 640* | 800 | 480 | 450* | 590 | 830 | 600* | 750 | 1010 | 510* | 650 | 880 | 230* | 340 | 540 |
| 90 | 640* | 790 | 480 | 450* | 590 | 830 | 600* | 750 | 1000 | 500* | 640 | 880 | 230* | 340 | 540 |
| 60 | 630* | 780 | 470 | 450* | 580 | 820 | 590* | 740 | 990 | 500* | 630 | 870 | 240* | 340 | 530 |
| 30 | 610* | 760 | 450 | 430* | 560 | 790 | 570* | 710 | 960 | 480* | 610 | 840 | 230* | 330 | 520 |
| 1 | 560* | 700 | 450 | 390* | 510 | 740 | 520* | 660 | 900 | 440* | 560 | 790 | 190* | 290 | 470 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | | MULTI STORY BRICK FACTORIES | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|------------|------------|-----------------------------|-----------------|-----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | TANKS | TOWED ARTY | WOOD FRAME BLDG | STORY BRICK APT | FACTORIES |
| | 400 | 0 | 390 | 780 | 970 | 870 | 870 | 30 | 0 | 0 | 0 | 0 | 0 | 870 | 0 |
| 470 | 350 | 450 | 810 | 940 | 840 | 940 | 180 | 0 | 0 | 0 | 0 | 0 | 840 | 350 | 0 |
| 540 | 410 | 490 | 840 | 1020 | 1020 | 1020 | 260 | 0 | 0 | 0 | 0 | 0 | 1020 | 410 | 0 |
| 510 | 460 | 530 | 870 | 1090 | 1090 | 1090 | 330 | 120 | 0 | 0 | 0 | 0 | 1090 | 460 | 0 |
| 480 | 550 | 570 | 890 | 1170 | 1170 | 1170 | 380 | 210 | 0 | 0 | 0 | 0 | 1170 | 550 | 0 |
| 450 | 720 | 720 | 910 | 1190 | 1190 | 1190 | 420 | 280 | 0 | 0 | 0 | 0 | 1190 | 720 | 0 |
| 420 | 880 | 880 | 930 | 1180 | 1180 | 1180 | 460 | 330 | 0 | 0 | 0 | 0 | 1180 | 880 | 0 |
| 390 | 910 | 910 | 950 | 1170 | 1170 | 1170 | 490 | 370 | 0 | 0 | 0 | 0 | 1170 | 910 | 0 |
| 360 | 910 | 910 | 970 | 1150 | 1150 | 1150 | 520 | 410 | 0 | 0 | 0 | 0 | 1150 | 910 | 0 |
| 330 | 900 | 900 | 990 | 1130 | 1130 | 1130 | 550 | 440 | 0 | 0 | 0 | 0 | 1130 | 900 | 0 |
| 300 | 870 | 870 | 990 | 1100 | 1100 | 1100 | 570 | 470 | 0 | 0 | 0 | 0 | 1100 | 870 | 0 |
| 270 | 840 | 840 | 1000 | 1070 | 1070 | 1070 | 590 | 490 | 90 | 90 | 0 | 0 | 1070 | 840 | 0 |
| 240 | 800 | 800 | 1010 | 1030 | 1030 | 1030 | 610 | 510 | 200 | 200 | 0 | 0 | 1030 | 800 | 300 |
| 210 | 770 | 770 | 1020 | 1010 | 1030 | 1030 | 620 | 530 | 250 | 240 | 100 | 0 | 1010 | 770 | 280 |
| 180 | 740 | 760 | 1020 | 980 | 980 | 1040 | 630 | 540 | 280 | 240 | 170 | 90 | 980 | 740 | 260 |
| 150 | 710 | 760 | 1030 | 950 | 950 | 1040 | 640 | 550 | 300 | 230 | 210 | 150 | 950 | 710 | 260 |
| 120 | 680 | 760 | 1020 | 910 | 910 | 1030 | 650 | 560 | 330 | 220 | 250 | 200 | 910 | 680 | 280 |
| 90 | 650 | 760 | 1020 | 870 | 870 | 1030 | 660 | 570 | 340 | 220 | 270 | 220 | 870 | 650 | 290 |
| 60 | 630 | 750 | 1000 | 840 | 830 | 1010 | 640 | 560 | 330 | 220 | 260 | 230 | 830 | 630 | 270 |
| 30 | 600 | 720 | 980 | 790 | 790 | 980 | 590 | 510 | 300 | 210 | 240 | 220 | 790 | 600 | 250 |
| 1 | 580 | 670 | 920 | 720 | 720 | 920 | 530 | 460 | 260 | 210 | 180 | 170 | 720 | 580 | 220 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

MEDIUM RANGE CANNON

2 KT

(6-38)

EFFECTS TABLES

(Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | HOB |
|----------------------|-------------------|-----------------|-------|----------------|----------|------------------|------|------|----------------|------|------|------------------|------|------|-----|
| I-PSI OVER-PRES-SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 3340 | 0 | 0 | 0 | 2070 | 1130 | 3700 | 3440 | 2040 | 2090 | 1890 | 1360 | 2800 | 2100 | 890 | 600 |
| 3330 | 0 | 0 | 0 | 2090 | 1150 | 3710 | 3450 | 2050 | 2110 | 1910 | 1370 | 2820 | 2220 | 920 | 570 |
| 3310 | 0 | 0 | 0 | 2100 | 1170 | 3720 | 3460 | 2070 | 2120 | 1920 | 1390 | 2820 | 2380 | 940 | 540 |
| 3290 | 0 | 0 | 0 | 2110 | 1190 | 3720 | 3470 | 2080 | 2130 | 1930 | 1410 | 2810 | 2400 | 970 | 510 |
| 3230 | 0 | 1280 | 0 | 2120 | 1210 | 3730 | 3470 | 2090 | 2140 | 1940 | 1420 | 2780 | 2410 | 990 | 480 |
| 3190 | 0 | 1320 | 0 | 2130 | 1220 | 3730 | 3480 | 2100 | 2150 | 1950 | 1440 | 2750 | 2390 | 1010 | 450 |
| 3120 | 0 | 1310 | 0 | 2140 | 1240 | 3740 | 3480 | 2110 | 2160 | 1960 | 1450 | 2710 | 2360 | 1020 | 420 |
| 3050 | 0 | 1300 | 890 | 2150 | 1250 | 3740 | 3490 | 2110 | 2170 | 1970 | 1460 | 2660 | 2320 | 1040 | 390 |
| 2970 | 0 | 1290 | 920 | 2150 | 1260 | 3750 | 3490 | 2120 | 2170 | 1980 | 1470 | 2600 | 2270 | 1060 | 360 |
| 2900 | 210 | 1270 | 920 | 2160 | 1280 | 3750 | 3500 | 2130 | 2180 | 1990 | 1480 | 2530 | 2220 | 1070 | 330 |
| 2810 | 420 | 1240 | 900 | 2170 | 1290 | 3760 | 3500 | 2140 | 2190 | 1990 | 1490 | 2460 | 2160 | 1080 | 300 |
| 2720 | 420 | 1200 | 860 | 2170 | 1300 | 3760 | 3500 | 2140 | 2190 | 2000 | 1500 | 2390 | 2100 | 1090 | 270 |
| 2620 | 410 | 1160 | 800 | 2180 | 1300 | 3760 | 3510 | 2150 | 2200 | 2010 | 1510 | 2300 | 2030 | 1100 | 240 |
| 2520 | 410 | 1130 | 750 | 2180 | 1310 | 3770 | 3510 | 2150 | 2200 | 2010 | 1510 | 2220 | 1960 | 1110 | 210 |
| 2410 | 410 | 1090 | 710 | 2190 | 1320 | 3770 | 3510 | 2160 | 2210 | 2020 | 1520 | 2120 | 1880 | 1110 | 180 |
| 2310 | 410 | 1040 | 690 | 2190 | 1320 | 3770 | 3520 | 2160 | 2210 | 2020 | 1520 | 2030 | 1800 | 1110 | 150 |
| 2200 | 400 | 980 | 660 | 2190 | 1330 | 3770 | 3520 | 2160 | 2210 | 2020 | 1530 | 1930 | 1710 | 1110 | 120 |
| 2100 | 390 | 930 | 640 | 2190 | 1330 | 3770 | 3520 | 2160 | 2210 | 2020 | 1530 | 1840 | 1630 | 1100 | 90 |
| 1990 | 380 | 880 | 620 | 2120 | 1280 | 3660 | 3410 | 2090 | 2130 | 1950 | 1470 | 1740 | 1540 | 1080 | 60 |
| 1880 | 360 | 840 | 610 | 1960 | 1170 | 3440 | 3200 | 1930 | 1980 | 1800 | 1350 | 1640 | 1450 | 1060 | 30 |
| 1780 | 340 | 820 | 580 | 1800 | 1060 | 3220 | 3000 | 1780 | 1820 | 1650 | 1240 | 1550 | 1360 | 990 | 1 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | |
|---------------|------|---------------|-------------------------|-------|--------------------|-------|-----------------------------|---------|------------------------|---------------------|-----------------------------|------|--------------------------|------|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 0 | 0 | 0 | 0 | 0 | 190 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 600 |
| 0 | 0 | 0 | 0 | 0 | 290 | 280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 570 |
| 0 | 0 | 0 | 0 | 0 | 350 | 340 | 130 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 540 |
| 0 | 0 | 0 | 0 | 0 | 410 | 400 | 1430 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 510 |
| 0 | 0 | 0 | 30 | 0 | 460 | 460 | 1420 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 480 |
| 0 | 0 | 0 | 110 | 0 | 510 | 520 | 1400 | 0 | 1140 | 0 | 0 | 0 | 0 | 0 | 450 |
| 0 | 0 | 0 | 170 | 0 | 870 | 810 | 1380 | 0 | 1190 | 0 | 0 | 0 | 0 | 0 | 420 |
| 0 | 0 | 0 | 210 | 0 | 910 | 810 | 1340 | 0 | 1190 | 0 | 0 | 0 | 0 | 0 | 390 |
| 0 | 0 | 0 | 250 | 10 | 920 | 790 | 1300 | 0 | 1180 | 0 | 0 | 0 | 0 | 0 | 360 |
| 0 | 0 | 0 | 290 | 50 | 910 | 770 | 1250 | 50 | 1170 | 0 | 0 | 0 | 0 | 0 | 330 |
| 0 | 0 | 0 | 320 | 90 | 980 | 740 | 1210 | 160 | 1130 | 0 | 0 | 0 | 0 | 50 | 300 |
| 0 | 0 | 0 | 340 | 130 | 940 | 720 | 1160 | 220 | 1100 | 0 | 0 | 0 | 0 | 100 | 270 |
| 0 | 0 | 0 | 360 | 160 | 910 | 690 | 1110 | 260 | 1060 | 0 | 0 | 0 | 0 | 140 | 240 |
| 0 | 0 | 0 | 370 | 190 | 780 | 650 | 1070 | 300 | 1030 | 0 | 0 | 0 | 0 | 180 | 210 |
| 200 | 210 | 50 | 380 | 210 | 290 | 620 | 1020 | 330 | 990 | 90 | 90 | 0 | 0 | 230 | 180 |
| 200 | 230 | 80 | 390 | 240 | 320 | 590 | 970 | 360 | 950 | 150 | 150 | 20 | 280 | 150 | 150 |
| 190 | 230 | 110 | 380 | 260 | 340 | 560 | 930 | 370 | 910 | 190 | 150 | 60 | 310 | 120 | 120 |
| 180 | 220 | 140 | 370 | 260 | 350 | 540 | 880 | 380 | 870 | 210 | 140 | 100 | 320 | 90 | 90 |
| 170 | 210 | 150 | 350 | 240 | 340 | 520 | 840 | 370 | 830 | 210 | 140 | 120 | 310 | 60 | 60 |
| 150 | 190 | 140 | 330 | 210 | 310 | 500 | 800 | 350 | 790 | 200 | 140 | 120 | 230 | 30 | 30 |
| 140 | 170 | 70 | 320 | 200 | 270 | 490 | 760 | 320 | 740 | 150 | 140 | 80 | 190 | 1 | 1 |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

MEDIUM RANGE CANNON

8 KT

(9-74)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|---------|-------|------|------------------|-------|------|----------|-------|------|----------|-------|------|-------------------|-------|------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH |
| 600 | 580* | 860 | 1280 | 70* | 470 | 910 | 480* | 770 | 1170 | 240* | 570 | 970 | 0 | 0 | 350 |
| 570 | 620* | 890 | 1300 | 190* | 530 | 950 | 540* | 810 | 1200 | 320* | 610 | 1010 | 0 | 0 | 420 |
| 540 | 670* | 930 | 1330 | 280* | 570 | 980 | 580* | 840 | 1220 | 390* | 660 | 1030 | 0 | 0 | 470 |
| 510 | 700* | 960 | 1350 | 340* | 620 | 1000 | 630* | 870 | 1250 | 440* | 690 | 1060 | 0 | 0 | 520 |
| 480 | 740* | 980 | 1370 | 400* | 650 | 1030 | 660* | 900 | 1270 | 490* | 730 | 1090 | 0 | 110 | 570 |
| 450 | 770* | 1010 | 1390 | 450* | 690 | 1050 | 700* | 930 | 1290 | 530* | 760 | 1110 | 0 | 200 | 600 |
| 420 | 800* | 1030 | 1400 | 490* | 720 | 1070 | 730* | 950 | 1310 | 570* | 790 | 1130 | 0 | 260 | 640 |
| 390 | 820* | 1050 | 1420 | 530* | 750 | 1090 | 760* | 970 | 1320 | 600* | 810 | 1150 | 30* | 320 | 670 |
| 360 | 850* | 1070 | 1430 | 560* | 770 | 1110 | 780* | 990 | 1340 | 630* | 840 | 1170 | 120* | 360 | 690 |
| 330 | 870* | 1090 | 1450 | 590* | 790 | 1130 | 800* | 1010 | 1350 | 660* | 860 | 1180 | 190* | 400 | 720 |
| 300 | 880* | 1100 | 1460 | 610* | 810 | 1140 | 820* | 1030 | 1360 | 680* | 880 | 1190 | 240* | 430 | 740 |
| 270 | 900* | 1110 | 1470 | 630* | 830 | 1160 | 840* | 1040 | 1380 | 700* | 890 | 1210 | 280* | 460 | 760 |
| 240 | 910* | 1120 | 1480 | 650* | 840 | 1170 | 850* | 1050 | 1380 | 720* | 910 | 1220 | 310* | 480 | 770 |
| 210 | 920* | 1130 | 1480 | 660* | 860 | 1170 | 860* | 1060 | 1390 | 730* | 920 | 1220 | 330* | 500 | 790 |
| 180 | 930* | 1140 | 1480 | 680* | 860 | 1180 | 870* | 1070 | 1390 | 740* | 920 | 1230 | 350* | 520 | 790 |
| 150 | 930* | 1140 | 1480 | 680* | 870 | 1180 | 870* | 1070 | 1390 | 740* | 930 | 1230 | 370* | 530 | 800 |
| 120 | 930* | 1130 | 1480 | 680* | 870 | 1180 | 870* | 1070 | 1390 | 740* | 920 | 1230 | 380* | 530 | 800 |
| 90 | 920* | 1130 | 1470 | 680* | 860 | 1170 | 870* | 1060 | 1380 | 740* | 920 | 1220 | 380* | 530 | 790 |
| 60 | 910* | 1110 | 1450 | 670* | 850 | 1150 | 850* | 1040 | 1360 | 730* | 900 | 1200 | 370* | 520 | 780 |
| 30 | 880* | 1080 | 1410 | 640* | 820 | 1120 | 830* | 1010 | 1330 | 700* | 880 | 1170 | 360* | 500 | 750 |
| 1 | 810* | 1000 | 1330 | 580* | 750 | 1050 | 760* | 940 | 1250 | 640* | 810 | 1100 | 310* | 450 | 690 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY FACTORIES | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------------|------------|-----------------------|-----------|-----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO SHLD | | | WOOD FRAME BLDG | BRICK APT | FACTORIES |
| | | | | | | | | | TANKS | TOWED ARTY | | | | |
| 600 | 1710 | 1710 | 1710 | 2230 | 2230 | 2230 | 1060 | 860 | 0 | 0 | 0 | 2230 | 1710 | 0 |
| 570 | 1760 | 1700 | 1700 | 2200 | 2200 | 2200 | 1090 | 900 | 0 | 0 | 0 | 2200 | 1700 | 0 |
| 540 | 1690 | 1690 | 1690 | 2170 | 2170 | 2170 | 1120 | 930 | 0 | 0 | 0 | 2170 | 1690 | 0 |
| 510 | 1670 | 1670 | 1670 | 2140 | 2140 | 2140 | 1140 | 960 | 0 | 0 | 0 | 2140 | 1670 | 0 |
| 480 | 1640 | 1640 | 1640 | 2100 | 2100 | 2100 | 1170 | 990 | 0 | 0 | 0 | 2100 | 1640 | 710 |
| 450 | 1600 | 1600 | 1600 | 2060 | 2060 | 2060 | 1190 | 1010 | 0 | 0 | 0 | 2060 | 1600 | 720 |
| 420 | 1560 | 1560 | 1560 | 2020 | 2020 | 2020 | 1210 | 1030 | 260 | 190 | 0 | 2020 | 1560 | 690 |
| 390 | 1520 | 1520 | 1520 | 1970 | 1970 | 1970 | 1230 | 1050 | 370 | 270 | 0 | 1970 | 1520 | 670 |
| 360 | 1470 | 1470 | 1470 | 1940 | 1940 | 1940 | 1240 | 1070 | 440 | 410 | 0 | 1940 | 1470 | 640 |
| 330 | 1430 | 1430 | 1430 | 1900 | 1900 | 1900 | 1260 | 1090 | 500 | 420 | 200 | 1900 | 1430 | 610 |
| 300 | 1390 | 1390 | 1390 | 1870 | 1870 | 1870 | 1270 | 1110 | 540 | 420 | 300 | 1870 | 1390 | 590 |
| 270 | 1360 | 1360 | 1400 | 1830 | 1830 | 1830 | 1280 | 1120 | 580 | 410 | 360 | 1830 | 1360 | 580 |
| 240 | 1320 | 1320 | 1410 | 1790 | 1790 | 1790 | 1290 | 1130 | 610 | 400 | 300 | 1790 | 1320 | 570 |
| 210 | 1290 | 1290 | 1420 | 1750 | 1750 | 1750 | 1300 | 1140 | 630 | 390 | 470 | 1750 | 1290 | 590 |
| 180 | 1250 | 1250 | 1420 | 1700 | 1700 | 1700 | 1310 | 1150 | 660 | 390 | 510 | 1700 | 1250 | 610 |
| 150 | 1220 | 1220 | 1420 | 1640 | 1640 | 1640 | 1320 | 1160 | 670 | 380 | 530 | 1640 | 1220 | 610 |
| 120 | 1190 | 1190 | 1420 | 1590 | 1590 | 1590 | 1320 | 1160 | 670 | 380 | 530 | 1590 | 1190 | 600 |
| 90 | 1160 | 1160 | 1400 | 1540 | 1540 | 1540 | 1280 | 1130 | 650 | 370 | 520 | 1540 | 1160 | 570 |
| 60 | 1130 | 1130 | 1390 | 1490 | 1490 | 1490 | 1240 | 1090 | 620 | 370 | 490 | 1490 | 1130 | 540 |
| 30 | 1100 | 1100 | 1350 | 1440 | 1440 | 1440 | 1210 | 1060 | 570 | 370 | 430 | 1440 | 1100 | 510 |
| 1 | 1070 | 1070 | 1270 | 1360 | 1360 | 1360 | 1170 | 1030 | 520 | 370 | 330 | 1360 | 1070 | 490 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

MEDIUM RANGE CANNON

8 KT

(9-74)

EFFECTS TABLES

(Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | HOB |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| 5580 | 0 | 2650 | 1930 | 4200 | 2690 | 7340 | 6770 | 4310 | 4200 | 3900 | 3030 | 4860 | 4240 | 1670 | 600 |
| 5490 | 0 | 2630 | 1920 | 4200 | 2700 | 7350 | 6770 | 4320 | 4210 | 3900 | 3040 | 4790 | 4190 | 1660 | 570 |
| 5390 | 840 | 2590 | 1900 | 4210 | 2710 | 7350 | 6780 | 4320 | 4220 | 3910 | 3050 | 4710 | 4130 | 1650 | 540 |
| 5300 | 840 | 2550 | 1870 | 4220 | 2720 | 7350 | 6780 | 4330 | 4230 | 3920 | 3060 | 4640 | 4060 | 1630 | 510 |
| 5200 | 850 | 2500 | 1840 | 4230 | 2740 | 7360 | 6790 | 4340 | 4230 | 3930 | 3070 | 4550 | 3990 | 1580 | 480 |
| 5090 | 850 | 2440 | 1790 | 4230 | 2750 | 7360 | 6790 | 4340 | 4240 | 3940 | 3080 | 4460 | 3920 | 1530 | 450 |
| 4980 | 850 | 2370 | 1740 | 4240 | 2750 | 7370 | 6800 | 4350 | 4250 | 3940 | 3090 | 4370 | 3850 | 1500 | 420 |
| 4870 | 850 | 2310 | 1680 | 4240 | 2760 | 7370 | 6800 | 4360 | 4250 | 3950 | 3100 | 4280 | 3770 | 1470 | 390 |
| 4750 | 840 | 2250 | 1620 | 4250 | 2770 | 7370 | 6800 | 4360 | 4260 | 3950 | 3110 | 4180 | 3680 | 1440 | 360 |
| 4630 | 840 | 2190 | 1560 | 4250 | 2780 | 7370 | 6810 | 4370 | 4260 | 3960 | 3110 | 4070 | 3600 | 1490 | 330 |
| 4510 | 830 | 2140 | 1510 | 4260 | 2780 | 7380 | 6810 | 4370 | 4270 | 3960 | 3120 | 3970 | 3510 | 1500 | 300 |
| 4390 | 820 | 2080 | 1470 | 4260 | 2790 | 7380 | 6810 | 4370 | 4270 | 3970 | 3120 | 3860 | 3410 | 1510 | 270 |
| 4270 | 810 | 2030 | 1430 | 4270 | 2800 | 7380 | 6810 | 4380 | 4270 | 3970 | 3130 | 3750 | 3310 | 1520 | 240 |
| 4140 | 800 | 1970 | 1390 | 4270 | 2800 | 7380 | 6820 | 4380 | 4280 | 3980 | 3130 | 3640 | 3210 | 1530 | 210 |
| 4020 | 790 | 1920 | 1340 | 4270 | 2800 | 7390 | 6820 | 4380 | 4280 | 3980 | 3140 | 3520 | 3110 | 1530 | 180 |
| 3900 | 770 | 1860 | 1310 | 4270 | 2810 | 7390 | 6820 | 4380 | 4280 | 3980 | 3140 | 3410 | 3010 | 1530 | 150 |
| 3770 | 760 | 1810 | 1270 | 4240 | 2780 | 7320 | 6760 | 4350 | 4250 | 3950 | 3110 | 3300 | 2910 | 1520 | 120 |
| 3650 | 740 | 1750 | 1240 | 4150 | 2710 | 7150 | 6610 | 4260 | 4160 | 3870 | 3040 | 3180 | 2810 | 1510 | 90 |
| 3520 | 730 | 1680 | 1220 | 4060 | 2640 | 6980 | 6450 | 4170 | 4070 | 3780 | 2960 | 3070 | 2710 | 1490 | 60 |
| 3390 | 710 | 1620 | 1190 | 3970 | 2570 | 6810 | 6300 | 4070 | 3980 | 3700 | 2880 | 2950 | 2600 | 1450 | 30 |
| 3270 | 690 | 1580 | 1120 | 3880 | 2500 | 6640 | 6150 | 3980 | 3890 | 3610 | 2810 | 2840 | 2500 | 1380 | 1 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|-------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIOS & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 0 | 0 | 0 | 460 | 0 | 0 | 1850 | 1470 | 2460 | 0 | 2410 | 0 | 0 | 0 | 0 | 600 |
| 0 | 0 | 0 | 510 | 0 | 0 | 1850 | 1450 | 2410 | 0 | 2400 | 0 | 0 | 0 | 0 | 570 |
| 0 | 0 | 0 | 550 | 40 | 0 | 1840 | 1420 | 2350 | 0 | 2380 | 0 | 0 | 0 | 0 | 540 |
| 0 | 0 | 0 | 590 | 90 | 0 | 1830 | 1400 | 2300 | 170 | 2340 | 0 | 0 | 0 | 0 | 510 |
| 0 | 0 | 0 | 630 | 130 | 0 | 1780 | 1370 | 2250 | 310 | 2300 | 0 | 0 | 0 | 70 | 480 |
| 0 | 0 | 0 | 660 | 180 | 0 | 1730 | 1340 | 2190 | 390 | 2260 | 0 | 0 | 0 | 140 | 450 |
| 0 | 0 | 0 | 690 | 220 | 290 | 1680 | 1310 | 2140 | 460 | 2210 | 0 | 0 | 0 | 210 | 420 |
| 0 | 0 | 0 | 720 | 260 | 420 | 1650 | 1270 | 2080 | 510 | 2170 | 0 | 0 | 0 | 260 | 390 |
| 400 | 440 | 0 | 740 | 300 | 490 | 1610 | 1240 | 2030 | 560 | 2120 | 0 | 0 | 0 | 310 | 360 |
| 400 | 450 | 0 | 750 | 330 | 550 | 1580 | 1200 | 1970 | 610 | 2080 | 0 | 0 | 0 | 360 | 330 |
| 400 | 460 | 70 | 760 | 360 | 610 | 1540 | 1160 | 1920 | 650 | 2030 | 110 | 110 | 0 | 420 | 300 |
| 390 | 460 | 110 | 770 | 390 | 640 | 1500 | 1120 | 1860 | 680 | 1980 | 210 | 210 | 0 | 490 | 270 |
| 380 | 460 | 160 | 770 | 410 | 670 | 1470 | 1090 | 1810 | 710 | 1930 | 290 | 260 | 0 | 550 | 240 |
| 370 | 460 | 190 | 770 | 430 | 710 | 1430 | 1050 | 1750 | 740 | 1880 | 350 | 260 | 80 | 600 | 210 |
| 370 | 450 | 230 | 760 | 450 | 730 | 1400 | 1020 | 1700 | 750 | 1830 | 390 | 250 | 130 | 630 | 180 |
| 360 | 430 | 260 | 750 | 460 | 750 | 1360 | 1000 | 1640 | 760 | 1770 | 420 | 240 | 180 | 650 | 150 |
| 340 | 410 | 280 | 730 | 450 | 750 | 1330 | 970 | 1590 | 760 | 1720 | 430 | 240 | 220 | 640 | 120 |
| 330 | 400 | 290 | 700 | 410 | 730 | 1280 | 950 | 1540 | 750 | 1660 | 420 | 230 | 240 | 600 | 90 |
| 310 | 380 | 290 | 670 | 380 | 690 | 1240 | 930 | 1490 | 720 | 1610 | 400 | 230 | 240 | 490 | 60 |
| 300 | 370 | 240 | 640 | 360 | 640 | 1200 | 900 | 1440 | 680 | 1550 | 350 | 230 | 220 | 410 | 30 |
| 290 | 360 | 130 | 630 | 350 | 580 | 1160 | 880 | 1390 | 630 | 1500 | 280 | 230 | 150 | 380 | 1 |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

FREE FLIGHT ROCKET

5 KT
(8-59)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|---------|-------|------|------------------|-------|------|----------|-------|------|----------|-------|------|-------------------|-------|------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH |
| 400 | 430* | 720 | 1120 | 0 | 320 | 770 | 330* | 630 | 1020 | 0 | 420 | 840 | 0 | 0 | 180 |
| 470 | 480* | 750 | 1150 | 0 | 380 | 800 | 400* | 670 | 1050 | 150* | 480 | 870 | 0 | 0 | 270 |
| 540 | 530* | 790 | 1170 | 90* | 440 | 840 | 450* | 710 | 1080 | 240* | 530 | 900 | 0 | 0 | 340 |
| 510 | 570* | 820 | 1190 | 190* | 490 | 870 | 500* | 740 | 1100 | 310* | 570 | 930 | 0 | 0 | 390 |
| 480 | 610* | 850 | 1220 | 270* | 530 | 890 | 540* | 770 | 1130 | 370* | 610 | 950 | 0 | 0 | 440 |
| 450 | 650* | 870 | 1230 | 330* | 570 | 920 | 580* | 800 | 1150 | 420* | 640 | 980 | 0 | 30 | 490 |
| 420 | 680* | 900 | 1250 | 380* | 600 | 940 | 610* | 830 | 1160 | 460* | 670 | 1000 | 0 | 130 | 520 |
| 390 | 700* | 920 | 1270 | 420* | 630 | 960 | 640* | 850 | 1180 | 500* | 700 | 1020 | 0 | 210 | 560 |
| 360 | 730* | 940 | 1280 | 450* | 660 | 980 | 670* | 870 | 1200 | 530* | 730 | 1040 | 0 | 260 | 590 |
| 330 | 750* | 960 | 1300 | 490* | 680 | 1000 | 690* | 890 | 1210 | 560* | 750 | 1050 | 80* | 310 | 610 |
| 300 | 770* | 970 | 1310 | 510* | 700 | 1010 | 710* | 910 | 1220 | 580* | 770 | 1070 | 140* | 340 | 640 |
| 270 | 790* | 990 | 1320 | 540* | 720 | 1030 | 730* | 920 | 1240 | 600* | 780 | 1080 | 190* | 380 | 660 |
| 240 | 800* | 1000 | 1330 | 560* | 740 | 1040 | 750* | 930 | 1240 | 620* | 800 | 1090 | 230* | 400 | 670 |
| 210 | 810* | 1010 | 1330 | 570* | 750 | 1050 | 760* | 940 | 1250 | 630* | 810 | 1100 | 260* | 420 | 690 |
| 180 | 820* | 1010 | 1340 | 580* | 760 | 1050 | 770* | 950 | 1250 | 640* | 820 | 1100 | 290* | 440 | 690 |
| 150 | 820* | 1010 | 1340 | 590* | 760 | 1050 | 770* | 950 | 1260 | 650* | 820 | 1100 | 300* | 450 | 700 |
| 120 | 820* | 1010 | 1330 | 590* | 760 | 1050 | 770* | 950 | 1250 | 650* | 820 | 1100 | 310* | 450 | 700 |
| 90 | 820* | 1000 | 1320 | 590* | 760 | 1040 | 770* | 940 | 1240 | 650* | 820 | 1090 | 320* | 450 | 700 |
| 60 | 800* | 990 | 1300 | 580* | 740 | 1030 | 750* | 930 | 1230 | 640* | 800 | 1080 | 310* | 450 | 690 |
| 30 | 780* | 960 | 1270 | 560* | 720 | 1000 | 730* | 900 | 1190 | 620* | 780 | 1050 | 300* | 430 | 660 |
| 0 | 710* | 890 | 1190 | 500* | 660 | 930 | 670* | 830 | 1120 | 560* | 710 | 980 | 260* | 380 | 600 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY FACTORIES | | |
|-----|---------------------------|-------|------|-------------------------|-------|------|------------------|---------|------------------|------|------------|-----------------------|-------|-------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | SUMMER | WINTER | EXPO | SHLD | | WOOD | WOOD | FACT- |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | UNIFORM | UNIFORM | | | | FRAME | BRICK | ORIES |
| 400 | 1300 | 1300 | 1300 | 1850 | 1850 | 1850 | 730 | 530 | 0 | 0 | 0 | 1850 | 1300 | 0 |
| 470 | 1360 | 1360 | 1360 | 1840 | 1840 | 1840 | 760 | 580 | 0 | 0 | 0 | 1840 | 1360 | 0 |
| 540 | 1380 | 1380 | 1380 | 1820 | 1820 | 1820 | 800 | 620 | 0 | 0 | 0 | 1820 | 1380 | 0 |
| 510 | 1390 | 1390 | 1390 | 1800 | 1800 | 1800 | 830 | 660 | 0 | 0 | 0 | 1800 | 1390 | 0 |
| 480 | 1380 | 1380 | 1380 | 1770 | 1770 | 1770 | 860 | 700 | 0 | 0 | 0 | 1770 | 1380 | 0 |
| 450 | 1370 | 1370 | 1370 | 1740 | 1740 | 1740 | 880 | 730 | 0 | 0 | 0 | 1740 | 1370 | 0 |
| 420 | 1340 | 1340 | 1340 | 1710 | 1710 | 1710 | 910 | 750 | 0 | 0 | 0 | 1710 | 1340 | 0 |
| 390 | 1300 | 1300 | 1300 | 1670 | 1670 | 1670 | 930 | 780 | 0 | 0 | 0 | 1670 | 1300 | 530 |
| 360 | 1260 | 1260 | 1260 | 1630 | 1630 | 1630 | 950 | 800 | 190 | 150 | 0 | 1630 | 1260 | 520 |
| 330 | 1220 | 1220 | 1240 | 1590 | 1590 | 1590 | 970 | 820 | 290 | 290 | 0 | 1590 | 1220 | 500 |
| 300 | 1180 | 1180 | 1250 | 1550 | 1550 | 1550 | 980 | 840 | 350 | 340 | 70 | 1550 | 1180 | 470 |
| 270 | 1140 | 1140 | 1260 | 1520 | 1520 | 1520 | 1000 | 860 | 400 | 340 | 190 | 1520 | 1140 | 450 |
| 240 | 1110 | 1110 | 1270 | 1490 | 1490 | 1490 | 1010 | 870 | 440 | 330 | 260 | 1490 | 1110 | 430 |
| 210 | 1070 | 1070 | 1280 | 1450 | 1450 | 1450 | 1020 | 880 | 470 | 320 | 310 | 1450 | 1070 | 430 |
| 180 | 1040 | 1040 | 1280 | 1410 | 1410 | 1410 | 1030 | 890 | 490 | 320 | 360 | 1410 | 1040 | 440 |
| 150 | 1010 | 1010 | 1280 | 1360 | 1360 | 1360 | 1040 | 900 | 510 | 310 | 400 | 1360 | 1010 | 460 |
| 120 | 980 | 980 | 1270 | 1310 | 1310 | 1310 | 1040 | 910 | 520 | 300 | 410 | 1310 | 980 | 460 |
| 90 | 950 | 960 | 1260 | 1270 | 1270 | 1280 | 1030 | 900 | 520 | 300 | 410 | 1270 | 950 | 440 |
| 60 | 920 | 940 | 1250 | 1230 | 1230 | 1260 | 980 | 860 | 490 | 300 | 390 | 1230 | 920 | 420 |
| 30 | 890 | 920 | 1220 | 1180 | 1180 | 1230 | 940 | 820 | 450 | 300 | 340 | 1180 | 890 | 390 |
| 0 | 870 | 870 | 1140 | 1100 | 1100 | 1150 | 890 | 780 | 400 | 300 | 260 | 1100 | 870 | 360 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

FREE FLIGHT ROCKET 5 KT (8-59)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|------|-----|
| 1-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 4700 | 0 | 2150 | 0 | 3390 | 2070 | 5020 | 5370 | 3440 | 3410 | 3140 | 2370 | 4140 | 3600 | 1200 | 600 |
| 4720 | 0 | 2150 | 1320 | 3400 | 2090 | 5020 | 5380 | 3450 | 3420 | 3150 | 2380 | 4090 | 3560 | 1320 | 570 |
| 4640 | 0 | 2130 | 1520 | 3410 | 2100 | 5030 | 5380 | 3460 | 3430 | 3160 | 2400 | 4030 | 3510 | 1330 | 540 |
| 4560 | 0 | 2120 | 1540 | 3420 | 2110 | 5030 | 5390 | 3470 | 3430 | 3170 | 2410 | 3970 | 3470 | 1360 | 510 |
| 4470 | 0 | 2090 | 1540 | 3430 | 2130 | 5040 | 5390 | 3470 | 3440 | 3180 | 2420 | 3900 | 3410 | 1350 | 480 |
| 4380 | 350 | 2060 | 1520 | 3440 | 2140 | 5040 | 5400 | 3480 | 3450 | 3190 | 2430 | 3830 | 3350 | 1340 | 450 |
| 4280 | 700 | 2020 | 1490 | 3440 | 2150 | 5050 | 5400 | 3490 | 3460 | 3190 | 2440 | 3750 | 3290 | 1300 | 420 |
| 4180 | 690 | 1970 | 1450 | 3450 | 2160 | 5050 | 5410 | 3500 | 3460 | 3200 | 2450 | 3670 | 3220 | 1310 | 390 |
| 4080 | 680 | 1910 | 1400 | 3460 | 2170 | 5050 | 5410 | 3500 | 3470 | 3210 | 2460 | 3580 | 3150 | 1330 | 360 |
| 3970 | 670 | 1860 | 1330 | 3460 | 2180 | 5060 | 5410 | 3510 | 3470 | 3210 | 2460 | 3490 | 3070 | 1340 | 330 |
| 3860 | 660 | 1810 | 1270 | 3470 | 2180 | 5060 | 5420 | 3510 | 3480 | 3220 | 2470 | 3390 | 2990 | 1350 | 300 |
| 3740 | 640 | 1760 | 1220 | 3470 | 2190 | 5060 | 5420 | 3520 | 3480 | 3220 | 2480 | 3290 | 2910 | 1360 | 270 |
| 3630 | 640 | 1710 | 1180 | 3470 | 2200 | 5060 | 5420 | 3520 | 3490 | 3230 | 2480 | 3190 | 2820 | 1370 | 240 |
| 3510 | 630 | 1660 | 1140 | 3480 | 2200 | 5070 | 5430 | 3520 | 3490 | 3230 | 2490 | 3080 | 2720 | 1380 | 210 |
| 3390 | 630 | 1600 | 1100 | 3480 | 2210 | 5070 | 5430 | 3530 | 3490 | 3230 | 2490 | 2980 | 2630 | 1380 | 180 |
| 3270 | 630 | 1540 | 1070 | 3480 | 2210 | 5070 | 5430 | 3530 | 3500 | 3240 | 2490 | 2870 | 2530 | 1380 | 150 |
| 3150 | 620 | 1490 | 1040 | 3490 | 2220 | 5070 | 5430 | 3530 | 3500 | 3240 | 2500 | 2760 | 2440 | 1370 | 120 |
| 3030 | 600 | 1430 | 1010 | 3410 | 2160 | 5050 | 5330 | 3460 | 3430 | 3170 | 2440 | 2650 | 2340 | 1360 | 90 |
| 2910 | 570 | 1370 | 990 | 3300 | 2080 | 5060 | 5160 | 3340 | 3310 | 3050 | 2350 | 2540 | 2240 | 1340 | 60 |
| 2790 | 550 | 1320 | 960 | 3180 | 1990 | 5060 | 5000 | 3230 | 3190 | 2940 | 2250 | 2430 | 2140 | 1310 | 30 |
| 2670 | 530 | 1300 | 910 | 3060 | 1910 | 5170 | 4830 | 3110 | 3080 | 2820 | 2160 | 2320 | 2040 | 1230 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|-------------------------------------|------|-----------------------|------|-----------------------------------|------|--------------------------------------|-----|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIOS & FIRE CON EQUIP | | OPEN GRID RADAR | | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTDD | TVLG | ERECT | CGO TRANS | LT OBSN | CON EQUIP | ANT | EXPO | SHLD | LOCO | CARS | | | |
| 0 | 0 | 0 | 180 | 0 | 0 | 030 | 800 | 2110 | 0 | 1880 | 0 | 0 | 0 | 0 | 0 | 600 | |
| 0 | 0 | 0 | 250 | 0 | 0 | 1380 | 1210 | 2080 | 0 | 1900 | 0 | 0 | 0 | 0 | 0 | 570 | |
| 0 | 0 | 0 | 310 | 0 | 0 | 1450 | 1210 | 2040 | 0 | 1910 | 0 | 0 | 0 | 0 | 0 | 540 | |
| 0 | 0 | 0 | 360 | 0 | 0 | 1460 | 1190 | 1990 | 0 | 1900 | 0 | 0 | 0 | 0 | 0 | 510 | |
| 0 | 0 | 0 | 430 | 0 | 0 | 1460 | 1170 | 1950 | 0 | 1890 | 0 | 0 | 0 | 0 | 0 | 480 | |
| 0 | 0 | 0 | 480 | 40 | 0 | 1450 | 1150 | 1890 | 50 | 1870 | 0 | 0 | 0 | 0 | 0 | 450 | |
| 0 | 0 | 0 | 480 | 90 | 0 | 1420 | 1120 | 1840 | 200 | 1830 | 0 | 0 | 0 | 0 | 0 | 420 | |
| 0 | 0 | 0 | 510 | 130 | 0 | 1370 | 1090 | 1790 | 290 | 1790 | 0 | 0 | 0 | 0 | 90 | 390 | |
| 0 | 0 | 0 | 540 | 170 | 210 | 1330 | 1060 | 1740 | 350 | 1750 | 0 | 0 | 0 | 0 | 150 | 360 | |
| 0 | 0 | 0 | 560 | 210 | 320 | 1290 | 1030 | 1690 | 400 | 1710 | 0 | 0 | 0 | 0 | 200 | 330 | |
| 0 | 310 | 0 | 580 | 240 | 390 | 1260 | 990 | 1630 | 440 | 1660 | 0 | 0 | 0 | 0 | 250 | 300 | |
| 300 | 320 | 20 | 590 | 280 | 440 | 1230 | 960 | 1580 | 490 | 1620 | 30 | 30 | 0 | 0 | 300 | 270 | |
| 300 | 330 | 70 | 600 | 300 | 480 | 1190 | 920 | 1530 | 520 | 1580 | 130 | 130 | 0 | 0 | 360 | 240 | |
| 200 | 340 | 110 | 600 | 330 | 510 | 1160 | 890 | 1480 | 550 | 1530 | 210 | 210 | 0 | 0 | 410 | 210 | |
| 200 | 350 | 140 | 600 | 350 | 540 | 1130 | 850 | 1420 | 570 | 1480 | 270 | 200 | 50 | 0 | 460 | 180 | |
| 200 | 350 | 170 | 590 | 370 | 560 | 1100 | 820 | 1370 | 590 | 1430 | 310 | 200 | 100 | 0 | 500 | 150 | |
| 200 | 340 | 200 | 580 | 370 | 570 | 1060 | 800 | 1320 | 600 | 1380 | 330 | 190 | 150 | 0 | 500 | 120 | |
| 270 | 320 | 220 | 560 | 350 | 560 | 1030 | 780 | 1270 | 590 | 1330 | 330 | 190 | 180 | 0 | 490 | 90 | |
| 250 | 300 | 220 | 530 | 310 | 540 | 990 | 760 | 1220 | 570 | 1280 | 320 | 180 | 180 | 0 | 420 | 60 | |
| 230 | 280 | 190 | 500 | 290 | 490 | 950 | 730 | 1170 | 530 | 1230 | 280 | 180 | 170 | 0 | 320 | 30 | |
| 210 | 270 | 90 | 490 | 280 | 440 | 910 | 710 | 1130 | 490 | 1180 | 210 | 180 | 110 | 0 | 290 | 0 | |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

FREE FLIGHT ROCKET 20 KT (9-105)

EFFECTS TABLES (Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 600 | 700* | 960 | 1350 | 340* | 610 | 1000 | 620* | 860 | 1240 | 430* | 680 | 1040 | U | n |
| 570 | 740* | 980 | 1370 | 390* | 650 | 1020 | 650* | 890 | 1260 | 470* | 710 | 1070 | U | 100 | 550 |
| 540 | 770* | 1010 | 1390 | 440* | 680 | 1050 | 690* | 920 | 1280 | 510* | 740 | 1090 | U | 180 | 590 |
| 510 | 790* | 1030 | 1410 | 480* | 710 | 1070 | 720* | 940 | 1300 | 550* | 770 | 1110 | U | 240 | 620 |
| 480 | 820* | 1050 | 1420 | 510* | 740 | 1090 | 740* | 960 | 1310 | 580* | 800 | 1130 | U | 290 | 650 |
| 450 | 840* | 1070 | 1440 | 550* | 760 | 1110 | 770* | 990 | 1330 | 610* | 820 | 1150 | RU* | 340 | 680 |
| 420 | 870* | 1090 | 1450 | 570* | 790 | 1130 | 790* | 1000 | 1350 | 640* | 840 | 1170 | 150* | 380 | 710 |
| 390 | 890* | 1100 | 1460 | 600* | 810 | 1140 | 810* | 1020 | 1360 | 660* | 860 | 1180 | 200* | 410 | 730 |
| 360 | 900* | 1120 | 1480 | 620* | 830 | 1160 | 830* | 1040 | 1370 | 690* | 880 | 1200 | 240* | 440 | 750 |
| 330 | 920* | 1130 | 1490 | 650* | 840 | 1170 | 850* | 1050 | 1380 | 710* | 900 | 1210 | 280* | 470 | 770 |
| 300 | 930* | 1140 | 1500 | 660* | 860 | 1180 | 860* | 1060 | 1390 | 720* | 910 | 1220 | 310* | 490 | 790 |
| 270 | 940* | 1150 | 1500 | 680* | 870 | 1190 | 880* | 1080 | 1400 | 740* | 930 | 1230 | 340* | 510 | 800 |
| 240 | 950* | 1160 | 1510 | 690* | 880 | 1200 | 890* | 1080 | 1410 | 750* | 940 | 1240 | 360* | 530 | 810 |
| 210 | 960* | 1170 | 1510 | 700* | 890 | 1210 | 900* | 1090 | 1410 | 760* | 940 | 1240 | 380* | 540 | 820 |
| 180 | 970* | 1170 | 1510 | 710* | 900 | 1210 | 900* | 1090 | 1410 | 770* | 950 | 1250 | 390* | 550 | 830 |
| 150 | 970* | 1170 | 1510 | 710* | 900 | 1210 | 900* | 1100 | 1410 | 770* | 950 | 1250 | 400* | 560 | 830 |
| 120 | 960* | 1170 | 1510 | 710* | 900 | 1200 | 900* | 1090 | 1410 | 770* | 950 | 1240 | 400* | 560 | 830 |
| 90 | 960* | 1160 | 1490 | 710* | 890 | 1190 | 890* | 1080 | 1400 | 760* | 940 | 1230 | 400* | 560 | 820 |
| 60 | 940* | 1140 | 1470 | 700* | 870 | 1180 | 880* | 1070 | 1380 | 750* | 930 | 1220 | 390* | 540 | 810 |
| 30 | 910* | 1110 | 1440 | 670* | 850 | 1140 | 850* | 1040 | 1350 | 730* | 900 | 1190 | 370* | 520 | 780 |
| 0 | 840* | 1030 | 1350 | 610* | 780 | 1070 | 780* | 960 | 1270 | 660* | 830 | 1110 | 320* | 460 | 710 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY FACTORIES | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|------------|-----------------------|-----------|-----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | | WOOD FRAME BLDG | BRICK APT | FACTORIES |
| | 600 | 2020 | 2020 | 2020 | 2620 | 2620 | 2620 | 1600 | 1370 | 0 | | 0 | 2620 | 2020 |
| 570 | 1980 | 1980 | 1980 | 2580 | 2580 | 2580 | 1620 | 1390 | 330 | 220 | 2580 | 1980 | 960 | |
| 540 | 1940 | 1940 | 1940 | 2540 | 2540 | 2540 | 1640 | 1410 | 460 | 280 | 2540 | 1940 | 930 | |
| 510 | 1890 | 1890 | 1890 | 2500 | 2500 | 2500 | 1650 | 1430 | 530 | 480 | 2500 | 1890 | 910 | |
| 480 | 1860 | 1860 | 1860 | 2470 | 2470 | 2470 | 1670 | 1440 | 600 | 500 | 2470 | 1860 | 890 | |
| 450 | 1820 | 1820 | 1820 | 2430 | 2430 | 2430 | 1680 | 1460 | 650 | 510 | 2430 | 1820 | 860 | |
| 420 | 1780 | 1780 | 1780 | 2400 | 2400 | 2400 | 1690 | 1470 | 700 | 500 | 2400 | 1780 | 840 | |
| 390 | 1750 | 1750 | 1750 | 2360 | 2360 | 2360 | 1700 | 1480 | 740 | 500 | 430 | 2360 | 1750 | 820 |
| 360 | 1710 | 1710 | 1710 | 2330 | 2330 | 2330 | 1710 | 1500 | 770 | 490 | 480 | 2330 | 1710 | 810 |
| 330 | 1680 | 1680 | 1680 | 2290 | 2290 | 2290 | 1720 | 1510 | 800 | 480 | 530 | 2290 | 1680 | 800 |
| 300 | 1650 | 1650 | 1650 | 2240 | 2240 | 2240 | 1730 | 1520 | 830 | 480 | 590 | 2240 | 1650 | 810 |
| 270 | 1610 | 1610 | 1610 | 2200 | 2200 | 2200 | 1740 | 1530 | 860 | 470 | 640 | 2200 | 1610 | 830 |
| 240 | 1580 | 1580 | 1580 | 2150 | 2150 | 2150 | 1750 | 1540 | 880 | 460 | 690 | 2150 | 1580 | 840 |
| 210 | 1540 | 1540 | 1540 | 2100 | 2100 | 2100 | 1750 | 1540 | 890 | 460 | 700 | 2100 | 1540 | 830 |
| 180 | 1510 | 1510 | 1510 | 2050 | 2050 | 2050 | 1760 | 1540 | 900 | 450 | 710 | 2050 | 1510 | 820 |
| 150 | 1490 | 1490 | 1490 | 2010 | 2010 | 2010 | 1740 | 1530 | 890 | 450 | 710 | 2010 | 1490 | 800 |
| 120 | 1460 | 1460 | 1460 | 1960 | 1960 | 1960 | 1720 | 1510 | 870 | 450 | 690 | 1960 | 1460 | 780 |
| 90 | 1440 | 1440 | 1440 | 1910 | 1910 | 1910 | 1700 | 1490 | 840 | 450 | 660 | 1910 | 1440 | 760 |
| 60 | 1410 | 1410 | 1410 | 1850 | 1850 | 1850 | 1680 | 1480 | 800 | 440 | 610 | 1850 | 1410 | 730 |
| 30 | 1380 | 1380 | 1380 | 1810 | 1810 | 1810 | 1660 | 1460 | 740 | 440 | 510 | 1810 | 1380 | 700 |
| 0 | 1340 | 1340 | 1340 | 1740 | 1740 | 1740 | 1630 | 1440 | 690 | 440 | 430 | 1740 | 1340 | 670 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

FREE FLIGHT ROCKET 20 KT (9-105)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 6410 | 10A0 | 3260 | 2430 | 5400 | 3590 | 10440 | 0520 | 5710 | 5390 | 4980 | 3950 | 5620 | 4940 | 1910 | 600 |
| 6310 | 10A0 | 3150 | 2380 | 5410 | 3600 | 10440 | 0520 | 5720 | 5390 | 4980 | 3960 | 5540 | 4870 | 1880 | 570 |
| 6200 | 1070 | 3080 | 2320 | 5410 | 3610 | 10440 | 0530 | 5720 | 5400 | 4990 | 3970 | 5450 | 4790 | 1850 | 540 |
| 6090 | 1070 | 3030 | 2270 | 5420 | 3620 | 10450 | 0530 | 5730 | 5400 | 5000 | 3970 | 5360 | 4720 | 1830 | 510 |
| 5980 | 1060 | 2980 | 2230 | 5420 | 3630 | 10450 | 0530 | 5730 | 5410 | 5000 | 3980 | 5260 | 4640 | 1800 | 480 |
| 5870 | 1050 | 2930 | 2180 | 5430 | 3630 | 10450 | 0540 | 5740 | 5410 | 5010 | 3990 | 5160 | 4560 | 1770 | 450 |
| 5760 | 1040 | 2880 | 2130 | 5430 | 3640 | 10450 | 0540 | 5740 | 5420 | 5010 | 3990 | 5060 | 4470 | 1740 | 420 |
| 5640 | 1030 | 2820 | 2090 | 5430 | 3640 | 10460 | 0540 | 5750 | 5420 | 5010 | 4000 | 4960 | 4380 | 1710 | 390 |
| 5530 | 1020 | 2770 | 2050 | 5440 | 3650 | 10460 | 0540 | 5750 | 5420 | 5020 | 4000 | 4860 | 4290 | 1680 | 360 |
| 5420 | 1010 | 2710 | 2000 | 5440 | 3650 | 10460 | 0540 | 5750 | 5430 | 5020 | 4010 | 4760 | 4200 | 1650 | 330 |
| 5300 | 1010 | 2660 | 1960 | 5440 | 3660 | 10460 | 0550 | 5760 | 5430 | 5030 | 4010 | 4650 | 4110 | 1620 | 300 |
| 5190 | 1000 | 2600 | 1910 | 5450 | 3660 | 10460 | 0550 | 5760 | 5430 | 5030 | 4010 | 4550 | 4020 | 1590 | 270 |
| 5070 | 990 | 2550 | 1870 | 5450 | 3670 | 10460 | 0550 | 5760 | 5440 | 5030 | 4020 | 4440 | 3920 | 1560 | 240 |
| 4960 | 980 | 2500 | 1820 | 5450 | 3670 | 10470 | 0550 | 5760 | 5440 | 5030 | 4020 | 4340 | 3830 | 1530 | 210 |
| 4840 | 970 | 2450 | 1770 | 5440 | 3660 | 10430 | 0520 | 5750 | 5420 | 5020 | 4010 | 4230 | 3730 | 1500 | 180 |
| 4720 | 960 | 2400 | 1730 | 5380 | 3630 | 10410 | 0410 | 5690 | 5370 | 4980 | 3970 | 4120 | 3640 | 1470 | 150 |
| 4600 | 930 | 2380 | 1690 | 5330 | 3600 | 10490 | 0300 | 5630 | 5320 | 4930 | 3940 | 4020 | 3540 | 1440 | 120 |
| 4490 | 910 | 2310 | 1670 | 5280 | 3560 | 10470 | 0190 | 5570 | 5260 | 4880 | 3900 | 3910 | 3440 | 1410 | 90 |
| 4370 | 890 | 2180 | 1650 | 5220 | 3530 | 9250 | 0080 | 5510 | 5210 | 4830 | 3860 | 3800 | 3350 | 1380 | 60 |
| 4250 | 870 | 2130 | 1630 | 5170 | 3490 | 9230 | 0070 | 5450 | 5150 | 4790 | 3820 | 3690 | 3250 | 1480 | 30 |
| 4130 | 850 | 2110 | 1560 | 5110 | 3460 | 9710 | 0060 | 5390 | 5100 | 4740 | 3780 | 3580 | 3150 | 1390 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|-------------------------------------|------|-----------------------|------|-----------------------------------|------|--------------------------------------|--|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIOS & FIRE CON EQUIP | | OPEN GRID RADAR | | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | ANT | ANT | EXPO | SHLD | LOCO | CARS | | | |
| 0 | 0 | 0 | 900 | 210 | 0 | 2310 | 1680 | 2760 | 540 | 3020 | 0 | 0 | 0 | 210 | 600 | | |
| 0 | 0 | 0 | 920 | 250 | 410 | 2260 | 1650 | 2710 | 600 | 2980 | 0 | 0 | 0 | 270 | 570 | | |
| 580 | 610 | 0 | 950 | 290 | 550 | 2230 | 1620 | 2660 | 660 | 2930 | 0 | 0 | 0 | 320 | 540 | | |
| 590 | 630 | 0 | 970 | 330 | 630 | 2190 | 1590 | 2610 | 710 | 2890 | 0 | 0 | 0 | 370 | 510 | | |
| 580 | 630 | 0 | 990 | 360 | 710 | 2160 | 1550 | 2560 | 760 | 2840 | 0 | 0 | 0 | 420 | 480 | | |
| 570 | 630 | 0 | 1000 | 390 | 770 | 2130 | 1510 | 2500 | 800 | 2800 | 0 | 0 | 0 | 470 | 450 | | |
| 560 | 630 | 50 | 1010 | 420 | 820 | 2090 | 1480 | 2450 | 850 | 2750 | 90 | 90 | 0 | 530 | 420 | | |
| 550 | 620 | 110 | 1020 | 440 | 870 | 2050 | 1440 | 2400 | 880 | 2710 | 200 | 200 | 0 | 600 | 390 | | |
| 540 | 620 | 150 | 1030 | 470 | 900 | 2010 | 1410 | 2350 | 910 | 2660 | 290 | 290 | 0 | 660 | 360 | | |
| 530 | 620 | 190 | 1030 | 490 | 940 | 1980 | 1370 | 2300 | 940 | 2610 | 370 | 300 | 0 | 720 | 330 | | |
| 530 | 620 | 230 | 1030 | 510 | 970 | 1940 | 1340 | 2240 | 970 | 2560 | 440 | 300 | 60 | 770 | 300 | | |
| 520 | 620 | 260 | 1020 | 530 | 1000 | 1910 | 1300 | 2190 | 990 | 2500 | 490 | 300 | 120 | 820 | 270 | | |
| 520 | 610 | 300 | 1010 | 550 | 1020 | 1880 | 1280 | 2140 | 1010 | 2450 | 520 | 290 | 170 | 850 | 240 | | |
| 520 | 600 | 330 | 1000 | 550 | 1040 | 1840 | 1260 | 2090 | 1020 | 2400 | 550 | 280 | 220 | 860 | 210 | | |
| 510 | 590 | 360 | 990 | 550 | 1040 | 1800 | 1240 | 2040 | 1020 | 2340 | 570 | 280 | 270 | 860 | 180 | | |
| 490 | 570 | 370 | 960 | 530 | 1040 | 1760 | 1210 | 1990 | 1010 | 2290 | 570 | 270 | 300 | 840 | 150 | | |
| 480 | 550 | 390 | 930 | 490 | 1010 | 1720 | 1190 | 1940 | 990 | 2230 | 550 | 270 | 310 | 790 | 120 | | |
| 460 | 530 | 380 | 900 | 470 | 980 | 1680 | 1170 | 1890 | 970 | 2180 | 540 | 270 | 320 | 680 | 90 | | |
| 450 | 520 | 350 | 880 | 440 | 930 | 1630 | 1150 | 1850 | 930 | 2130 | 500 | 260 | 310 | 590 | 60 | | |
| 430 | 510 | 160 | 850 | 430 | 870 | 1590 | 1130 | 1800 | 890 | 2070 | 440 | 260 | 270 | 520 | 30 | | |
| 420 | 500 | 160 | 840 | 420 | 810 | 1550 | 1110 | 1750 | 840 | 2010 | 360 | 260 | 190 | 490 | 0 | | |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

GUIDED MISSILE 10 KT (9-80)

EFFECTS TABLES (Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 577 | 640* | 400 | 1310 | 230* | 540 | 950 | 550* | 810 | 1200 | 340* | 620 | 1010 | 0 | 0 |
| 527 | 700* | 450 | 1340 | 340* | 610 | 1000 | 620* | 870 | 1240 | 440* | 690 | 1050 | 0 | 0 | 520 |
| 452 | 780* | 1010 | 1390 | 460* | 700 | 1060 | 710* | 930 | 1290 | 540* | 770 | 1110 | 0 | 230 | 610 |
| 402 | 820* | 1050 | 1410 | 520* | 740 | 1090 | 750* | 970 | 1320 | 600* | 810 | 1140 | 40* | 320 | 660 |
| 352 | 860* | 1080 | 1440 | 570* | 780 | 1120 | 790* | 1000 | 1340 | 640* | 850 | 1170 | 170* | 390 | 710 |
| 277 | 900* | 1110 | 1460 | 630* | 830 | 1150 | 840* | 1040 | 1370 | 700* | 890 | 1200 | 280* | 460 | 760 |
| 227 | 920* | 1130 | 1480 | 660* | 850 | 1170 | 860* | 1050 | 1380 | 720* | 910 | 1220 | 320* | 500 | 780 |
| 417 | 810* | 1040 | 1410 | 510* | 730 | 1080 | 740* | 960 | 1310 | 580* | 800 | 1130 | 0 | 300 | 650 |
| 367 | 850* | 1070 | 1430 | 560* | 770 | 1110 | 780* | 990 | 1330 | 630* | 840 | 1160 | 140* | 370 | 690 |
| 292 | 890* | 1110 | 1460 | 620* | 820 | 1150 | 830* | 1030 | 1360 | 690* | 880 | 1190 | 260* | 450 | 750 |
| 242 | 910* | 1120 | 1470 | 650* | 840 | 1160 | 850* | 1050 | 1380 | 710* | 900 | 1210 | 310* | 490 | 770 |
| 192 | 930* | 1130 | 1480 | 670* | 860 | 1170 | 870* | 1060 | 1390 | 730* | 920 | 1220 | 350* | 510 | 790 |
| 177 | 930* | 1140 | 1480 | 680* | 860 | 1180 | 870* | 1060 | 1390 | 740* | 920 | 1220 | 360* | 520 | 790 |
| 67 | 910* | 1110 | 1450 | 670* | 850 | 1150 | 850* | 1040 | 1360 | 730* | 900 | 1200 | 370* | 520 | 780 |
| 0 | 810* | 1000 | 1320 | 580* | 750 | 1040 | 760* | 940 | 1240 | 640* | 810 | 1090 | 300* | 440 | 690 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY FACTORIES | | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|------------|-----------------------|-----------|-----------|------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | | WOOD FRAME BLDG | BRICK APT | FACTORIES | |
| | 577 | 1780 | 1780 | 1780 | 2290 | 2290 | 2290 | 1190 | 1000 | 0 | | 0 | 0 | 0 | 2290 |
| 527 | 1730 | 1730 | 1730 | 2240 | 2240 | 2240 | 1230 | 1040 | 0 | 0 | 0 | 0 | 2240 | 1730 | 790 |
| 452 | 1640 | 1640 | 1640 | 2130 | 2130 | 2130 | 1280 | 1100 | 260 | 190 | 0 | 0 | 2130 | 1640 | 750 |
| 402 | 1570 | 1570 | 1570 | 2060 | 2060 | 2060 | 1310 | 1130 | 430 | 410 | 0 | 0 | 2060 | 1570 | 710 |
| 352 | 1510 | 1510 | 1510 | 2010 | 2010 | 2010 | 1340 | 1160 | 530 | 430 | 220 | 0 | 2010 | 1510 | 660 |
| 277 | 1410 | 1410 | 1410 | 1920 | 1920 | 1920 | 1370 | 1200 | 620 | 410 | 400 | 270 | 1920 | 1410 | 620 |
| 227 | 1350 | 1350 | 1410 | 1850 | 1850 | 1850 | 1380 | 1210 | 670 | 400 | 490 | 360 | 1850 | 1350 | 640 |
| 417 | 1590 | 1590 | 1590 | 2080 | 2080 | 2080 | 1300 | 1120 | 390 | 360 | 0 | 0 | 2080 | 1590 | 720 |
| 367 | 1530 | 1530 | 1530 | 2020 | 2020 | 2020 | 1330 | 1150 | 500 | 430 | 160 | 0 | 2020 | 1530 | 680 |
| 292 | 1430 | 1430 | 1430 | 1940 | 1940 | 1940 | 1360 | 1190 | 610 | 420 | 370 | 220 | 1940 | 1430 | 630 |
| 242 | 1370 | 1370 | 1410 | 1870 | 1870 | 1870 | 1380 | 1210 | 650 | 400 | 460 | 340 | 1870 | 1370 | 630 |
| 192 | 1310 | 1310 | 1420 | 1790 | 1790 | 1790 | 1390 | 1220 | 690 | 390 | 540 | 420 | 1790 | 1310 | 660 |
| 177 | 1300 | 1300 | 1420 | 1760 | 1760 | 1760 | 1400 | 1230 | 700 | 390 | 550 | 430 | 1760 | 1300 | 660 |
| 67 | 1190 | 1190 | 1390 | 1570 | 1570 | 1570 | 1330 | 1170 | 660 | 380 | 510 | 480 | 1570 | 1190 | 590 |
| 0 | 1120 | 1120 | 1270 | 1430 | 1430 | 1430 | 1250 | 1100 | 540 | 380 | 350 | 340 | 1430 | 1120 | 520 |

GUIDED MISSILE 10 KT (9-80)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | | | SAFETY RADII | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|-------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER* | |
| | | | | | | | | | | | | | | | |
| 5670 | 1070 | 2830 | 2020 | 4450 | 2900 | 7030 | 7270 | 4590 | 4450 | 4130 | 3250 | 4060 | 4340 | 1730 | 577 |
| 5510 | 1040 | 2710 | 1970 | 4460 | 2920 | 7040 | 7280 | 4600 | 4460 | 4140 | 3270 | 4030 | 4230 | 1670 | 527 |
| 5250 | 980 | 2520 | 1850 | 4470 | 2940 | 7050 | 7290 | 4620 | 4480 | 4160 | 3290 | 4010 | 4050 | 1570 | 452 |
| 5060 | 940 | 2420 | 1760 | 4480 | 2960 | 7050 | 7300 | 4630 | 4490 | 4170 | 3300 | 4000 | 3920 | 1520 | 402 |
| 4870 | 900 | 2320 | 1670 | 4490 | 2970 | 7060 | 7300 | 4630 | 4490 | 4180 | 3310 | 4000 | 3780 | 1480 | 352 |
| 4670 | 870 | 2190 | 1560 | 4500 | 2980 | 7060 | 7310 | 4640 | 4500 | 4190 | 3330 | 4010 | 3550 | 1510 | 277 |
| 4370 | 880 | 2190 | 1490 | 4510 | 2990 | 7070 | 7310 | 4650 | 4510 | 4190 | 3330 | 3930 | 3390 | 1520 | 227 |
| 5120 | 950 | 2450 | 1790 | 4480 | 2950 | 7050 | 7300 | 4620 | 4480 | 4170 | 3300 | 4000 | 3960 | 1540 | 417 |
| 4920 | 910 | 2350 | 1700 | 4490 | 2960 | 7060 | 7300 | 4630 | 4490 | 4170 | 3310 | 4000 | 3820 | 1490 | 367 |
| 4630 | 870 | 2210 | 1580 | 4500 | 2980 | 7060 | 7310 | 4640 | 4500 | 4190 | 3320 | 4000 | 3600 | 1500 | 292 |
| 4430 | 880 | 2120 | 1510 | 4510 | 2990 | 7070 | 7310 | 4650 | 4510 | 4190 | 3330 | 3990 | 3440 | 1520 | 242 |
| 4230 | 880 | 2030 | 1430 | 4510 | 2990 | 7070 | 7310 | 4650 | 4510 | 4200 | 3340 | 3700 | 3270 | 1520 | 192 |
| 4170 | 880 | 2010 | 1410 | 4510 | 3000 | 7070 | 7310 | 4650 | 4510 | 4200 | 3340 | 3650 | 3220 | 1520 | 177 |
| 3720 | 790 | 1780 | 1300 | 4310 | 2840 | 7050 | 6950 | 4450 | 4310 | 4010 | 3170 | 3240 | 2850 | 1490 | 67 |
| 3440 | 730 | 1670 | 1190 | 4130 | 2700 | 7180 | 6630 | 4260 | 4130 | 3840 | 3020 | 2990 | 2630 | 1370 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTDD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 0 | 0 | 0 | 590 | 40 | 0 | 1060 | 1490 | 2470 | 0 | 2540 | 0 | 0 | 0 | 0 | 577 |
| 0 | 0 | 0 | 650 | 110 | 0 | 1020 | 1440 | 2380 | 280 | 2470 | 0 | 0 | 0 | 20 | 527 |
| 0 | 0 | 0 | 730 | 220 | 310 | 1790 | 1370 | 2250 | 480 | 2360 | 0 | 0 | 0 | 210 | 452 |
| 440 | 460 | 0 | 770 | 280 | 490 | 1730 | 1310 | 2160 | 560 | 2290 | 0 | 0 | 0 | 290 | 402 |
| 440 | 450 | 0 | 790 | 340 | 600 | 1680 | 1250 | 2070 | 640 | 2210 | 0 | 0 | 0 | 380 | 352 |
| 400 | 450 | 130 | 820 | 410 | 700 | 1590 | 1160 | 1930 | 730 | 2090 | 250 | 250 | 0 | 540 | 277 |
| 390 | 470 | 190 | 810 | 440 | 750 | 1530 | 1100 | 1840 | 780 | 2010 | 370 | 260 | 70 | 630 | 227 |
| 440 | 430 | 0 | 760 | 260 | 450 | 1750 | 1330 | 2180 | 540 | 2310 | 0 | 0 | 0 | 270 | 417 |
| 440 | 460 | 0 | 790 | 320 | 570 | 1700 | 1270 | 2090 | 620 | 2230 | 0 | 0 | 0 | 350 | 367 |
| 410 | 450 | 110 | 810 | 390 | 680 | 1600 | 1180 | 1960 | 720 | 2120 | 210 | 210 | 0 | 510 | 292 |
| 390 | 470 | 180 | 820 | 430 | 740 | 1550 | 1120 | 1870 | 770 | 2030 | 340 | 260 | 40 | 600 | 242 |
| 410 | 490 | 230 | 800 | 470 | 780 | 1490 | 1070 | 1780 | 800 | 1940 | 410 | 250 | 130 | 670 | 192 |
| 420 | 500 | 250 | 830 | 470 | 790 | 1470 | 1050 | 1750 | 800 | 1920 | 430 | 250 | 160 | 680 | 177 |
| 360 | 420 | 300 | 710 | 390 | 740 | 1320 | 970 | 1560 | 760 | 1720 | 420 | 230 | 250 | 520 | 67 |
| 300 | 380 | 120 | 670 | 360 | 620 | 1230 | 920 | 1460 | 670 | 1600 | 290 | 230 | 150 | 390 | 0 |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

GUIDED MISSILE

50 KT

(11-159)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|---------|-------|------|------------------|-------|------|----------|-------|------|----------|-------|------|-------------------|-------|------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT | IMMED | IMMED | LAT |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH | PERM | TRAN | LETH |
| 737 | 020 | 1040 | 1470 | 320* | 640 | 1080 | 650* | 920 | 1330 | 420* | 710 | 1110 | 0 | 0 | 530 |
| 687 | 950 | 1090 | 1510 | 420* | 710 | 1130 | 710* | 980 | 1370 | 500* | 770 | 1160 | 0 | 90 | 600 |
| 612 | 900* | 1150 | 1560 | 540* | 900 | 1190 | 800* | 1050 | 1430 | 610* | 850 | 1220 | 0 | 280 | 700 |
| 662 | 940* | 1190 | 1590 | 600* | 950 | 1230 | 850* | 1090 | 1460 | 670* | 900 | 1250 | 60* | 360 | 750 |
| 512 | 980* | 1220 | 1610 | 660* | 990 | 1260 | 890* | 1120 | 1490 | 720* | 940 | 1290 | 180* | 440 | 800 |
| 437 | 1030* | 1270 | 1650 | 720* | 940 | 1300 | 950* | 1170 | 1520 | 780* | 990 | 1330 | 360 | 520 | 860 |
| 387 | 1060* | 1290 | 1670 | 760* | 980 | 1320 | 980* | 1190 | 1540 | 820* | 1020 | 1350 | 360* | 570 | 890 |
| 464 | 1010* | 1250 | 1640 | 700* | 930 | 1290 | 930* | 1150 | 1510 | 760* | 980 | 1310 | 370 | 490 | 840 |
| 414 | 1040* | 1280 | 1660 | 740* | 960 | 1310 | 960* | 1180 | 1530 | 800* | 1010 | 1340 | 350 | 540 | 870 |
| 339 | 1080* | 1310 | 1680 | 790* | 1000 | 1340 | 1000* | 1210 | 1560 | 850* | 1050 | 1370 | 410* | 600 | 920 |
| 289 | 1100* | 1330 | 1700 | 820* | 1020 | 1360 | 1020* | 1230 | 1580 | 870* | 1070 | 1390 | 450* | 630 | 940 |
| 239 | 1120* | 1340 | 1710 | 840* | 1040 | 1370 | 1040* | 1250 | 1590 | 890* | 1080 | 1400 | 480* | 660 | 960 |
| 164 | 1130* | 1350 | 1710 | 850* | 1050 | 1380 | 1050* | 1250 | 1590 | 900* | 1090 | 1410 | 510* | 680 | 970 |
| 114 | 1120* | 1340 | 1700 | 850* | 1040 | 1370 | 1050* | 1250 | 1580 | 900* | 1090 | 1400 | 510* | 680 | 970 |
| 0 | 980* | 1190 | 1540 | 730* | 910 | 1230 | 920* | 1110 | 1430 | 780* | 960 | 1260 | 410* | 570 | 840 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY FACTORIES | | |
|-----|---------------------------|-------|------|-------------------------|-------|------|------------------|---------|------------------|------|------------|-----------------------|-------|-------|
| | IMMED | IMMED | LAT | IMMED | IMMED | LAT | SUMMER | WINTER | EXPO | SHLD | | WOOD | BRICK | FACT- |
| | PERM | TRAN | LETH | PERM | TRAN | LETH | UNIFORM | UNIFORM | | | | FRAME | APT | ORIES |
| 737 | 2720 | 2720 | 2720 | 3580 | 3580 | 3580 | 2410 | 2090 | 720 | 430 | 0 | 3580 | 2720 | 1460 |
| 687 | 2660 | 2660 | 2660 | 3520 | 3520 | 3520 | 2430 | 2110 | 860 | 700 | 0 | 3520 | 2660 | 1420 |
| 612 | 2560 | 2560 | 2560 | 3430 | 3430 | 3430 | 2460 | 2150 | 1020 | 740 | 430 | 3430 | 2560 | 1370 |
| 662 | 2500 | 2500 | 2500 | 3370 | 3370 | 3370 | 2480 | 2170 | 1110 | 740 | 600 | 3370 | 2500 | 1330 |
| 512 | 2440 | 2440 | 2440 | 3300 | 3300 | 3300 | 2500 | 2190 | 1170 | 720 | 730 | 3300 | 2440 | 1300 |
| 437 | 2370 | 2370 | 2370 | 3200 | 3200 | 3200 | 2530 | 2220 | 1250 | 710 | 870 | 3200 | 2370 | 1280 |
| 387 | 2310 | 2310 | 2310 | 3120 | 3120 | 3120 | 2540 | 2230 | 1300 | 690 | 970 | 3120 | 2310 | 1290 |
| 464 | 2400 | 2400 | 2400 | 3240 | 3240 | 3240 | 2520 | 2210 | 1220 | 710 | 820 | 3240 | 2400 | 1290 |
| 414 | 2340 | 2340 | 2340 | 3160 | 3160 | 3160 | 2530 | 2230 | 1280 | 700 | 910 | 3160 | 2340 | 1290 |
| 339 | 2250 | 2250 | 2250 | 3040 | 3040 | 3040 | 2550 | 2250 | 1340 | 680 | 1050 | 3040 | 2250 | 1300 |
| 289 | 2190 | 2190 | 2190 | 2960 | 2960 | 2960 | 2560 | 2260 | 1370 | 670 | 1090 | 2960 | 2190 | 1300 |
| 239 | 2140 | 2140 | 2140 | 2890 | 2890 | 2890 | 2560 | 2260 | 1380 | 670 | 1100 | 2890 | 2140 | 1270 |
| 164 | 2070 | 2070 | 2070 | 2770 | 2770 | 2770 | 2550 | 2250 | 1340 | 660 | 1070 | 2770 | 2070 | 1220 |
| 114 | 2030 | 2030 | 2030 | 2690 | 2690 | 2690 | 2540 | 2240 | 1280 | 660 | 1010 | 2690 | 2030 | 1180 |
| 0 | 1900 | 1900 | 1900 | 2460 | 2460 | 2460 | 2500 | 2210 | 1070 | 650 | 720 | 2460 | 1900 | 1070 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

GUIDED MISSILE 50 KT (11-159)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | | | SAFETY RADII | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|-------|------|-------------------|------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 8500 | 1570 | 4600 | 3400 | 7900 | 5020 | 15090 | 14570 | 8690 | 7840 | 7180 | 5520 | 7550 | 6650 | 2630 | 737 |
| 8410 | 1550 | 4490 | 3330 | 7910 | 5030 | 15000 | 14580 | 8700 | 7850 | 7190 | 5530 | 7400 | 6520 | 2590 | 687 |
| 8120 | 1520 | 4340 | 3240 | 7920 | 5050 | 15000 | 14590 | 8710 | 7860 | 7200 | 5550 | 7150 | 6310 | 2510 | 612 |
| 7930 | 1490 | 4230 | 3180 | 7930 | 5060 | 15000 | 14590 | 8720 | 7870 | 7200 | 5550 | 6980 | 6170 | 2460 | 562 |
| 7740 | 1470 | 4130 | 3110 | 7930 | 5070 | 15010 | 14590 | 8720 | 7870 | 7210 | 5560 | 6810 | 6020 | 2410 | 512 |
| 7450 | 1450 | 3970 | 3000 | 7940 | 5080 | 15010 | 14600 | 8730 | 7880 | 7220 | 5570 | 6550 | 5790 | 2330 | 437 |
| 7260 | 1450 | 3850 | 2930 | 7950 | 5090 | 15010 | 14600 | 8730 | 7880 | 7230 | 5580 | 6370 | 5630 | 2280 | 387 |
| 7560 | 1460 | 4030 | 3040 | 7940 | 5080 | 15010 | 14600 | 8730 | 7880 | 7220 | 5570 | 6640 | 5870 | 2360 | 464 |
| 7360 | 1450 | 3920 | 2970 | 7940 | 5090 | 15010 | 14600 | 8730 | 7880 | 7220 | 5580 | 6470 | 5720 | 2310 | 414 |
| 7070 | 1440 | 3740 | 2860 | 7950 | 5100 | 15020 | 14600 | 8740 | 7890 | 7230 | 5590 | 6200 | 5480 | 2230 | 334 |
| 6880 | 1430 | 3630 | 2790 | 7950 | 5100 | 15020 | 14600 | 8740 | 7890 | 7230 | 5590 | 6020 | 5320 | 2180 | 284 |
| 6680 | 1400 | 3530 | 2710 | 7930 | 5090 | 15070 | 14550 | 8710 | 7860 | 7210 | 5580 | 5840 | 5160 | 2130 | 234 |
| 6380 | 1350 | 3330 | 2610 | 7860 | 5060 | 15750 | 14430 | 8640 | 7800 | 7160 | 5540 | 5570 | 4920 | 2040 | 164 |
| 6180 | 1320 | 3210 | 2560 | 7820 | 5030 | 15670 | 14350 | 8590 | 7760 | 7120 | 5510 | 5390 | 4750 | 1970 | 114 |
| 5720 | 1220 | 3110 | 2440 | 7720 | 4980 | 15080 | 14170 | 8470 | 7660 | 7030 | 5450 | 4970 | 4380 | 1840 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 1020 | 1070 | 0 | 1450 | 440 | 890 | 3330 | 2300 | 3740 | 1020 | 4360 | 0 | 0 | 0 | 520 | 737 |
| 1000 | 1070 | 0 | 1490 | 500 | 1060 | 3260 | 2240 | 3650 | 1110 | 4280 | 0 | 0 | 0 | 610 | 687 |
| 980 | 1040 | 20 | 1530 | 580 | 1240 | 3170 | 2140 | 3520 | 1240 | 4160 | 0 | 0 | 0 | 750 | 612 |
| 950 | 1030 | 160 | 1550 | 630 | 1340 | 3110 | 2080 | 3430 | 1310 | 4080 | 240 | 240 | 0 | 870 | 562 |
| 940 | 1020 | 250 | 1570 | 670 | 1420 | 3040 | 2020 | 3340 | 1380 | 3990 | 420 | 420 | 0 | 980 | 512 |
| 920 | 1020 | 360 | 1570 | 730 | 1510 | 2950 | 1940 | 3210 | 1460 | 3860 | 630 | 460 | 90 | 1140 | 437 |
| 920 | 1020 | 420 | 1570 | 770 | 1570 | 2880 | 1880 | 3120 | 1500 | 3760 | 750 | 460 | 190 | 1230 | 387 |
| 920 | 1020 | 330 | 1570 | 710 | 1480 | 2980 | 1970 | 3250 | 1430 | 3910 | 560 | 460 | 30 | 1080 | 464 |
| 920 | 1020 | 390 | 1570 | 750 | 1540 | 2920 | 1910 | 3170 | 1480 | 3820 | 690 | 460 | 140 | 1180 | 414 |
| 930 | 1030 | 480 | 1550 | 800 | 1620 | 2820 | 1830 | 3040 | 1530 | 3670 | 810 | 450 | 290 | 1290 | 334 |
| 930 | 1010 | 540 | 1530 | 810 | 1650 | 2760 | 1790 | 2950 | 1550 | 3580 | 870 | 430 | 380 | 1320 | 284 |
| 910 | 990 | 590 | 1500 | 800 | 1660 | 2690 | 1760 | 2860 | 1550 | 3480 | 890 | 420 | 470 | 1320 | 234 |
| 870 | 940 | 630 | 1430 | 720 | 1620 | 2580 | 1690 | 2740 | 1520 | 3340 | 870 | 410 | 520 | 1220 | 164 |
| 840 | 900 | 620 | 1380 | 680 | 1550 | 2500 | 1660 | 2660 | 1470 | 3240 | 850 | 410 | 530 | 1020 | 114 |
| 760 | 840 | 300 | 1290 | 620 | 1300 | 2330 | 1580 | 2480 | 1290 | 3010 | 600 | 410 | 340 | 790 | 0 |

GUIDED MISSILE 100 KT (11-218)

EFFECTS TABLES (Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 838 | 1400 | 1400 | 1600 | 330* | 690 | 1170 | 690* | 990 | 1440 | 420* | 750 | 1190 | 0 | 0 |
| 788 | 1290 | 1290 | 1640 | 440* | 770 | 1220 | 760* | 1050 | 1490 | 520* | 820 | 1240 | 0 | 40 | 640 |
| 713 | 1150 | 1260 | 1700 | 570* | 860 | 1290 | 660* | 1130 | 1550 | 640* | 910 | 1310 | 80 | 270 | 750 |
| 663 | 1080 | 1300 | 1730 | 640* | 920 | 1330 | 620* | 1180 | 1580 | 710* | 960 | 1350 | 200 | 370 | 810 |
| 613 | 1070* | 1340 | 1760 | 710* | 970 | 1370 | 670* | 1220 | 1620 | 770* | 1010 | 1390 | 500 | 500 | 860 |
| 538 | 1130* | 1390 | 1800 | 790* | 1030 | 1420 | 730* | 1270 | 1660 | 840* | 1070 | 1440 | 500 | 550 | 930 |
| 488 | 1160* | 1420 | 1830 | 830* | 1070 | 1450 | 780* | 1300 | 1680 | 890* | 1110 | 1470 | 490 | 610 | 970 |
| 614 | 1070* | 1340 | 1760 | 710* | 970 | 1370 | 660* | 1220 | 1620 | 770* | 1010 | 1390 | 490 | 490 | 860 |
| 564 | 1110* | 1370 | 1790 | 760* | 1010 | 1400 | 710* | 1250 | 1640 | 820* | 1050 | 1420 | 510 | 520 | 910 |
| 489 | 1160* | 1420 | 1830 | 830* | 1070 | 1450 | 770* | 1300 | 1680 | 880* | 1110 | 1460 | 490 | 610 | 970 |
| 439 | 1190* | 1440 | 1850 | 870* | 1100 | 1470 | 810* | 1330 | 1710 | 920* | 1140 | 1490 | 470 | 550 | 1000 |
| 389 | 1320 | 1460 | 1870 | 900* | 1130 | 1500 | 840* | 1350 | 1730 | 950* | 1170 | 1510 | 460* | 590 | 1030 |
| 314 | 1420 | 1490 | 1890 | 940* | 1160 | 1520 | 880* | 1380 | 1750 | 990* | 1200 | 1540 | 540* | 740 | 1070 |
| 264 | 1270* | 1510 | 1900 | 960* | 1180 | 1540 | 900* | 1400 | 1760 | 1010* | 1220 | 1550 | 570* | 770 | 1090 |
| 0 | 1270 | 1350 | 1720 | 850* | 1050 | 1380 | 750* | 1260 | 1600 | 900* | 1090 | 1410 | 500* | 670 | 970 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY BRICK FACTORIES | | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|------------|-----------------------------|-----------------|-----------|-----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | | TANKS | WOOD FRAME BLDG | BRICK APT | FACTORIES |
| | 838 | 3480 | 3480 | 3480 | 4620 | 4620 | 4620 | 3270 | 2860 | 1300 | | 980 | 0 | 4620 | 3480 |
| 788 | 3410 | 3410 | 3410 | 4550 | 4550 | 4550 | 3290 | 2880 | 1410 | 1010 | 560 | 4550 | 3410 | 1980 | |
| 713 | 3300 | 3300 | 3300 | 4450 | 4450 | 4450 | 3320 | 2920 | 1560 | 1000 | 870 | 4450 | 3300 | 1920 | |
| 663 | 3250 | 3250 | 3250 | 4380 | 4380 | 4380 | 3340 | 2940 | 1630 | 990 | 1010 | 4380 | 3250 | 1900 | |
| 613 | 3200 | 3200 | 3200 | 4310 | 4310 | 4310 | 3360 | 2960 | 1690 | 980 | 1120 | 4310 | 3200 | 1870 | |
| 538 | 3110 | 3110 | 3110 | 4200 | 4200 | 4200 | 3380 | 2980 | 1780 | 960 | 1260 | 4200 | 3110 | 1850 | |
| 488 | 3050 | 3050 | 3050 | 4120 | 4120 | 4120 | 3390 | 3000 | 1830 | 940 | 1370 | 4120 | 3050 | 1850 | |
| 614 | 3200 | 3200 | 3200 | 4310 | 4310 | 4310 | 3360 | 2960 | 1690 | 980 | 1120 | 4310 | 3200 | 1870 | |
| 564 | 3140 | 3140 | 3140 | 4240 | 4240 | 4240 | 3370 | 2980 | 1750 | 960 | 1210 | 4240 | 3140 | 1850 | |
| 489 | 3050 | 3050 | 3050 | 4120 | 4120 | 4120 | 3390 | 3000 | 1830 | 940 | 1370 | 4120 | 3050 | 1850 | |
| 439 | 2990 | 2990 | 2990 | 4040 | 4040 | 4040 | 3410 | 3010 | 1880 | 930 | 1470 | 4040 | 2990 | 1850 | |
| 389 | 2930 | 2930 | 2930 | 3950 | 3950 | 3950 | 3420 | 3030 | 1910 | 920 | 1540 | 3950 | 2930 | 1840 | |
| 314 | 2840 | 2840 | 2840 | 3830 | 3830 | 3830 | 3430 | 3040 | 1940 | 910 | 1560 | 3830 | 2840 | 1820 | |
| 264 | 2790 | 2790 | 2790 | 3750 | 3750 | 3750 | 3440 | 3050 | 1930 | 900 | 1560 | 3750 | 2790 | 1800 | |
| 0 | 2530 | 2530 | 2530 | 3250 | 3250 | 3250 | 3440 | 3060 | 1520 | 890 | 1040 | 3250 | 2530 | 1530 | |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

GUIDED MISSILE

100 KT

(11-218)

EFFECTS TABLES

(Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|-------|-------|-------------------|-------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 108A0 | 2190 | 5950 | 4340 | 11130 | 6790 | 21790 | 20140 | 12500 | 11000 | 10070 | 7460 | 9580 | 8450 | 5580 | 838 |
| 106A0 | 2150 | 5830 | 4280 | 11130 | 6800 | 21790 | 20140 | 12510 | 11000 | 10080 | 7470 | 9410 | 8310 | 5530 | 788 |
| 103A0 | 2110 | 5660 | 4210 | 11140 | 6820 | 21790 | 20140 | 12520 | 11010 | 10090 | 7490 | 9140 | 8090 | 5250 | 713 |
| 10190 | 2080 | 5540 | 4160 | 11150 | 6830 | 21800 | 20150 | 12520 | 11020 | 10090 | 7500 | 8960 | 7930 | 5190 | 663 |
| 9990 | 2060 | 5430 | 4090 | 11160 | 6840 | 21800 | 20150 | 12530 | 11030 | 10100 | 7500 | 8790 | 7780 | 5140 | 613 |
| 9690 | 2050 | 5260 | 3990 | 11160 | 6850 | 21800 | 20160 | 12530 | 11030 | 10110 | 7510 | 8520 | 7540 | 5060 | 558 |
| 9490 | 2050 | 5130 | 3930 | 11170 | 6860 | 21810 | 20160 | 12540 | 11040 | 10110 | 7520 | 8350 | 7370 | 5010 | 488 |
| 9990 | 2060 | 5440 | 4090 | 11160 | 6840 | 21800 | 20150 | 12530 | 11030 | 10100 | 7500 | 8790 | 7780 | 5140 | 614 |
| 9790 | 2050 | 5320 | 4030 | 11160 | 6840 | 21800 | 20150 | 12530 | 11030 | 10110 | 7510 | 8610 | 7620 | 5090 | 564 |
| 9490 | 2050 | 5130 | 3930 | 11170 | 6860 | 21810 | 20160 | 12540 | 11040 | 10110 | 7520 | 8340 | 7380 | 5010 | 489 |
| 9290 | 2040 | 5000 | 3860 | 11170 | 6860 | 21810 | 20160 | 12540 | 11040 | 10120 | 7530 | 8150 | 7210 | 4960 | 439 |
| 9090 | 2020 | 4860 | 3800 | 11180 | 6870 | 21810 | 20160 | 12540 | 11050 | 10120 | 7530 | 7970 | 7050 | 4910 | 389 |
| 8790 | 1980 | 4670 | 3690 | 11180 | 6870 | 21810 | 20160 | 12550 | 11050 | 10120 | 7540 | 7690 | 6800 | 4820 | 314 |
| 8580 | 1940 | 4550 | 3620 | 11180 | 6880 | 21810 | 20160 | 12550 | 11050 | 10130 | 7540 | 7510 | 6630 | 4760 | 264 |
| 7490 | 1700 | 4120 | 3330 | 11180 | 6880 | 21800 | 20150 | 12540 | 11050 | 10120 | 7540 | 6510 | 5740 | 2430 | 0 |

SEVERE DAMAGE

| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIOS & FIRE CON EQUIP | | OPEN GRID RADAR | | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
|---------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|-------------------------------------|------|-----------------------|------|-----------------------------------|------|--------------------------------------|--|-----|
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | CON EQUIP | ANT | EXPO | SHLD | LOCO | CARS | | | |
| 1530 | 1600 | 0 | 2100 | 720 | 1630 | 4470 | 2930 | 4770 | 1620 | 5840 | 0 | 0 | 0 | 940 | 838 | | |
| 1480 | 1570 | 20 | 2130 | 780 | 1770 | 4410 | 2870 | 4670 | 1720 | 5760 | 0 | 0 | 0 | 1050 | 788 | | |
| 1430 | 1540 | 270 | 2170 | 850 | 1940 | 4300 | 2770 | 4540 | 1840 | 5620 | 360 | 360 | 0 | 1230 | 713 | | |
| 1410 | 1520 | 370 | 2190 | 900 | 2030 | 4230 | 2710 | 4440 | 1910 | 5530 | 560 | 560 | 0 | 1350 | 663 | | |
| 1400 | 1510 | 460 | 2200 | 940 | 2110 | 4160 | 2650 | 4350 | 1970 | 5440 | 730 | 620 | 20 | 1470 | 613 | | |
| 1400 | 1510 | 570 | 2200 | 1000 | 2210 | 4060 | 2560 | 4210 | 2060 | 5290 | 950 | 640 | 210 | 1640 | 558 | | |
| 1420 | 1520 | 640 | 2200 | 1040 | 2270 | 3990 | 2500 | 4120 | 2110 | 5190 | 1080 | 640 | 320 | 1730 | 488 | | |
| 1400 | 1510 | 450 | 2200 | 940 | 2110 | 4160 | 2650 | 4350 | 1970 | 5440 | 730 | 620 | 20 | 1470 | 614 | | |
| 1390 | 1510 | 540 | 2200 | 980 | 2170 | 4090 | 2590 | 4260 | 2030 | 5340 | 880 | 640 | 150 | 1580 | 564 | | |
| 1420 | 1520 | 640 | 2200 | 1040 | 2270 | 3990 | 2500 | 4130 | 2100 | 5190 | 1070 | 640 | 320 | 1730 | 489 | | |
| 1440 | 1540 | 700 | 2180 | 1070 | 2330 | 3930 | 2450 | 4040 | 2140 | 5090 | 1150 | 620 | 430 | 1800 | 439 | | |
| 1460 | 1550 | 770 | 2160 | 1090 | 2370 | 3860 | 2410 | 3950 | 2160 | 4990 | 1220 | 610 | 530 | 1850 | 389 | | |
| 1440 | 1520 | 960 | 2120 | 1080 | 2400 | 3750 | 2350 | 3810 | 2180 | 4830 | 1280 | 590 | 670 | 1870 | 314 | | |
| 1420 | 1480 | 890 | 2080 | 1050 | 2390 | 3670 | 2310 | 3720 | 2170 | 4730 | 1280 | 590 | 740 | 1840 | 264 | | |
| 1190 | 1250 | 460 | 1820 | 850 | 1900 | 3240 | 2110 | 3280 | 1820 | 4160 | 870 | 570 | 320 | 1130 | 0 | | |

MARK 50 BOMB

3 KT
(7-46)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|------|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 525 | 430* | 680 | 1040 | 0 | 330 | 730 | 350* | 600 | 960 | 100* | 430 | 790 | 0 | 0 |
| 675 | 500* | 730 | 1080 | 130* | 420 | 780 | 440* | 660 | 1000 | 250* | 500 | 840 | 0 | 0 | 330 |
| 800 | 590* | 790 | 1120 | 300* | 520 | 840 | 530* | 730 | 1050 | 390* | 590 | 900 | 0 | 30 | 450 |
| 950 | 630* | 830 | 1150 | 370* | 570 | 870 | 580* | 770 | 1080 | 450* | 630 | 930 | 0 | 180 | 500 |
| 1100 | 670* | 860 | 1170 | 430* | 610 | 900 | 620* | 900 | 1100 | 500* | 670 | 950 | 40* | 270 | 550 |
| 1225 | 710* | 890 | 1190 | 490* | 650 | 930 | 660* | 930 | 1120 | 550* | 710 | 980 | 190* | 340 | 590 |
| 1375 | 720* | 900 | 1200 | 510* | 670 | 940 | 680* | 950 | 1130 | 570* | 730 | 990 | 240* | 380 | 610 |
| 1505 | 590* | 800 | 1130 | 310* | 530 | 840 | 540* | 740 | 1050 | 390* | 600 | 900 | 0 | 60 | 450 |
| 1645 | 640* | 830 | 1150 | 380* | 570 | 880 | 580* | 770 | 1080 | 450* | 640 | 930 | 0 | 190 | 510 |
| 1790 | 690* | 870 | 1180 | 450* | 610 | 910 | 640* | 820 | 1110 | 520* | 690 | 970 | 120* | 300 | 570 |
| 1920 | 710* | 890 | 1200 | 490* | 650 | 930 | 660* | 840 | 1120 | 550* | 710 | 980 | 190* | 350 | 600 |
| 2080 | 720* | 900 | 1200 | 510* | 670 | 940 | 680* | 850 | 1130 | 570* | 730 | 990 | 230* | 370 | 610 |
| 225 | 720* | 900 | 1190 | 520* | 670 | 930 | 680* | 840 | 1120 | 570* | 730 | 990 | 270* | 400 | 620 |
| 245 | 700* | 870 | 1160 | 500* | 650 | 910 | 660* | 820 | 1090 | 560* | 710 | 960 | 270* | 390 | 600 |
| 0 | 630* | 790 | 1070 | 440* | 580 | 830 | 590* | 740 | 1010 | 490* | 640 | 880 | 220* | 330 | 530 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | | | MULTI STORY FACTORIES | | |
|------|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|-------|------------|-----------------------|-----------|-----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | TANKS | TOWED ARTY | WOOD FRAME BLDG | BRICK APT | FACTORIES |
| | 525 | 900 | 900 | 980 | 1490 | 1490 | 1490 | 530 | 360 | 0 | 0 | 0 | 0 | 1490 | 900 |
| 675 | 1100 | 1100 | 1100 | 1480 | 1480 | 1480 | 590 | 440 | 0 | 0 | 0 | 0 | 1480 | 1100 | 0 |
| 800 | 1120 | 1120 | 1120 | 1420 | 1420 | 1420 | 670 | 540 | 0 | 0 | 0 | 0 | 1420 | 1120 | 0 |
| 950 | 1080 | 1080 | 1100 | 1370 | 1370 | 1370 | 710 | 580 | 0 | 0 | 0 | 0 | 1370 | 1080 | 0 |
| 1100 | 1010 | 1010 | 1120 | 1300 | 1300 | 1300 | 740 | 620 | 170 | 140 | 0 | 0 | 1300 | 1010 | 410 |
| 1225 | 920 | 920 | 1140 | 1230 | 1230 | 1230 | 780 | 670 | 320 | 280 | 160 | 0 | 1230 | 920 | 350 |
| 1375 | 870 | 870 | 1150 | 1170 | 1170 | 1170 | 800 | 690 | 370 | 270 | 250 | 180 | 1170 | 870 | 330 |
| 1505 | 1120 | 1120 | 1120 | 1420 | 1420 | 1420 | 670 | 540 | 0 | 0 | 0 | 0 | 1420 | 1120 | 0 |
| 1645 | 1070 | 1070 | 1100 | 1360 | 1360 | 1360 | 710 | 590 | 0 | 0 | 0 | 0 | 1360 | 1070 | 0 |
| 1790 | 980 | 980 | 1130 | 1270 | 1270 | 1270 | 760 | 640 | 250 | 250 | 0 | 0 | 1270 | 980 | 380 |
| 1920 | 920 | 920 | 1140 | 1220 | 1220 | 1220 | 780 | 670 | 330 | 280 | 170 | 40 | 1220 | 920 | 340 |
| 2080 | 870 | 870 | 1150 | 1180 | 1180 | 1180 | 800 | 690 | 370 | 270 | 240 | 170 | 1180 | 870 | 330 |
| 225 | 700 | 860 | 1140 | 1050 | 1050 | 1150 | 820 | 710 | 410 | 250 | 330 | 280 | 1050 | 790 | 360 |
| 245 | 740 | 830 | 1110 | 990 | 990 | 1120 | 760 | 660 | 380 | 250 | 300 | 280 | 990 | 740 | 320 |
| 0 | 710 | 760 | 1020 | 890 | 890 | 1030 | 680 | 590 | 320 | 250 | 210 | 200 | 890 | 710 | 290 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

MARK 50 BOMB

3 KT

(7-46)

EFFECTS TABLES

(Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 3000 | 0 | 1630 | 0 | 2670 | 1570 | 4690 | 4290 | 2660 | 2690 | 2450 | 1830 | 3370 | 2920 | 1090 | 525 |
| 3700 | 0 | 1620 | 0 | 2680 | 1600 | 4600 | 4300 | 2680 | 2700 | 2470 | 1850 | 3290 | 2860 | 1120 | 475 |
| 3500 | 300 | 1690 | 1170 | 2700 | 1630 | 4610 | 4310 | 2700 | 2720 | 2490 | 1880 | 3140 | 2750 | 1170 | 400 |
| 3440 | 500 | 1530 | 1140 | 2720 | 1650 | 4620 | 4320 | 2710 | 2730 | 2500 | 1900 | 3020 | 2650 | 1190 | 350 |
| 3280 | 550 | 1460 | 1060 | 2730 | 1660 | 4620 | 4320 | 2720 | 2740 | 2510 | 1910 | 2880 | 2530 | 1220 | 300 |
| 3010 | 500 | 1370 | 910 | 2740 | 1680 | 4630 | 4330 | 2730 | 2760 | 2530 | 1930 | 2650 | 2340 | 1240 | 225 |
| 2830 | 490 | 1290 | 850 | 2740 | 1690 | 4630 | 4330 | 2740 | 2760 | 2530 | 1930 | 2680 | 2200 | 1240 | 175 |
| 3580 | 300 | 1580 | 1170 | 2710 | 1630 | 4610 | 4310 | 2700 | 2720 | 2490 | 1880 | 3130 | 2740 | 1170 | 395 |
| 3430 | 500 | 1530 | 1130 | 2720 | 1650 | 4620 | 4320 | 2710 | 2740 | 2500 | 1900 | 3000 | 2640 | 1200 | 345 |
| 3170 | 530 | 1420 | 930 | 2730 | 1670 | 4630 | 4330 | 2730 | 2750 | 2520 | 1920 | 2790 | 2460 | 1230 | 270 |
| 2990 | 500 | 1360 | 800 | 2740 | 1680 | 4630 | 4330 | 2730 | 2760 | 2530 | 1930 | 2630 | 2330 | 1240 | 220 |
| 2840 | 490 | 1300 | 850 | 2740 | 1690 | 4630 | 4330 | 2740 | 2760 | 2530 | 1930 | 2500 | 2210 | 1240 | 180 |
| 2530 | 490 | 1140 | 790 | 2750 | 1700 | 4640 | 4340 | 2750 | 2770 | 2540 | 1940 | 2210 | 1950 | 1230 | 95 |
| 2330 | 450 | 1040 | 760 | 2540 | 1560 | 4750 | 4060 | 2540 | 2550 | 2340 | 1780 | 2040 | 1800 | 1200 | 45 |
| 2160 | 410 | 1020 | 710 | 2320 | 1400 | 4040 | 3770 | 2320 | 2340 | 2140 | 1610 | 1880 | 1650 | 1110 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 0 | 0 | 0 | 100 | 0 | 0 | 620 | 600 | 1720 | 0 | 1360 | 0 | 0 | 0 | 0 | 525 |
| 0 | 0 | 0 | 210 | 0 | 0 | 1100 | 980 | 1670 | 0 | 1490 | 0 | 0 | 0 | 0 | 475 |
| 0 | 0 | 0 | 330 | 20 | 0 | 1140 | 940 | 1560 | 0 | 1480 | 0 | 0 | 0 | 0 | 400 |
| 0 | 0 | 0 | 330 | 90 | 0 | 1110 | 900 | 1480 | 180 | 1420 | 0 | 0 | 0 | 50 | 350 |
| 0 | 0 | 0 | 430 | 150 | 180 | 1030 | 860 | 1400 | 280 | 1360 | 0 | 0 | 0 | 130 | 300 |
| 240 | 230 | 30 | 470 | 230 | 340 | 960 | 770 | 1270 | 390 | 1260 | 40 | 40 | 0 | 240 | 225 |
| 230 | 250 | 90 | 480 | 280 | 390 | 910 | 720 | 1190 | 440 | 1190 | 170 | 170 | 0 | 330 | 175 |
| 0 | 0 | 0 | 330 | 20 | 0 | 1140 | 940 | 1550 | 0 | 1470 | 0 | 0 | 0 | 0 | 395 |
| 0 | 0 | 0 | 390 | 100 | 0 | 1100 | 900 | 1470 | 190 | 1420 | 0 | 0 | 0 | 50 | 345 |
| 0 | 0 | 0 | 450 | 190 | 270 | 1000 | 830 | 1350 | 330 | 1320 | 0 | 0 | 0 | 170 | 270 |
| 240 | 240 | 30 | 470 | 240 | 350 | 950 | 770 | 1260 | 390 | 1260 | 60 | 60 | 0 | 250 | 220 |
| 230 | 250 | 90 | 480 | 270 | 390 | 910 | 720 | 1200 | 430 | 1200 | 160 | 160 | 0 | 320 | 180 |
| 250 | 280 | 170 | 450 | 300 | 440 | 830 | 650 | 1060 | 470 | 1070 | 260 | 160 | 130 | 400 | 95 |
| 200 | 240 | 180 | 410 | 260 | 410 | 770 | 610 | 980 | 440 | 1000 | 250 | 160 | 150 | 300 | 45 |
| 160 | 210 | 80 | 390 | 240 | 340 | 710 | 580 | 910 | 390 | 920 | 170 | 160 | 90 | 230 | 0 |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

MARK 50 BOMB

10 KT
(9-80)

EFFECTS TABLES

(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 577 | 640* | 900 | 1310 | 230* | 540 | 950 | 550* | 910 | 1200 | 340* | 620 | 1010 | 0 | 0 |
| 527 | 700* | 950 | 1340 | 340* | 610 | 1000 | 620* | 970 | 1240 | 440* | 690 | 1050 | 0 | 0 | 520 |
| 452 | 780* | 1010 | 1390 | 460* | 700 | 1060 | 710* | 930 | 1290 | 540* | 770 | 1110 | 0 | 230 | 610 |
| 402 | 820* | 1050 | 1410 | 520* | 740 | 1090 | 750* | 970 | 1320 | 600* | 810 | 1140 | 40* | 320 | 660 |
| 352 | 860* | 1080 | 1440 | 570* | 780 | 1120 | 790* | 1000 | 1340 | 640* | 850 | 1170 | 170* | 390 | 710 |
| 277 | 900* | 1110 | 1460 | 630* | 830 | 1150 | 840* | 1040 | 1370 | 700* | 890 | 1200 | 280* | 460 | 760 |
| 227 | 920* | 1130 | 1480 | 660* | 850 | 1170 | 860* | 1050 | 1380 | 720* | 910 | 1220 | 320* | 500 | 780 |
| 417 | 810* | 1040 | 1410 | 510* | 730 | 1080 | 740* | 960 | 1310 | 580* | 800 | 1130 | 0 | 300 | 650 |
| 367 | 850* | 1070 | 1430 | 560* | 770 | 1110 | 780* | 990 | 1330 | 630* | 840 | 1160 | 140* | 370 | 690 |
| 292 | 890* | 1110 | 1460 | 620* | 820 | 1150 | 830* | 1030 | 1360 | 690* | 880 | 1190 | 260* | 450 | 750 |
| 242 | 910* | 1120 | 1470 | 650* | 840 | 1160 | 850* | 1050 | 1380 | 710* | 900 | 1210 | 310* | 490 | 770 |
| 192 | 930* | 1130 | 1480 | 670* | 860 | 1170 | 870* | 1060 | 1390 | 730* | 920 | 1220 | 350* | 510 | 790 |
| 177 | 930* | 1140 | 1480 | 680* | 860 | 1180 | 870* | 1060 | 1390 | 740* | 920 | 1220 | 360* | 520 | 790 |
| 67 | 910* | 1110 | 1450 | 670* | 850 | 1150 | 850* | 1040 | 1360 | 730* | 900 | 1200 | 370* | 520 | 780 |
| 0 | 810* | 1000 | 1320 | 580* | 750 | 1040 | 760* | 940 | 1240 | 640* | 810 | 1090 | 300* | 440 | 690 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | MULTI STORY FACTORIES | | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|------------|-----------------------|-----------------|-----------|-----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | | TANKS | WOOD FRAME BLDG | BRICK APT | FACTORIES |
| | | | | | | | | | | | | | | | |
| 527 | 1730 | 1730 | 1730 | 2240 | 2240 | 2240 | 1230 | 1040 | 0 | 0 | 0 | 2240 | 1730 | 790 | |
| 452 | 1640 | 1640 | 1640 | 2130 | 2130 | 2130 | 1280 | 1100 | 260 | 190 | 0 | 2130 | 1640 | 750 | |
| 402 | 1570 | 1570 | 1570 | 2060 | 2060 | 2060 | 1310 | 1130 | 430 | 410 | 0 | 2060 | 1570 | 710 | |
| 352 | 1510 | 1510 | 1510 | 2010 | 2010 | 2010 | 1340 | 1160 | 530 | 430 | 220 | 2010 | 1510 | 660 | |
| 277 | 1410 | 1410 | 1410 | 1920 | 1920 | 1920 | 1370 | 1200 | 620 | 410 | 400 | 1920 | 1410 | 620 | |
| 227 | 1350 | 1350 | 1410 | 1850 | 1850 | 1850 | 1380 | 1210 | 670 | 400 | 490 | 1850 | 1350 | 640 | |
| 417 | 1590 | 1590 | 1590 | 2080 | 2080 | 2080 | 1300 | 1120 | 390 | 360 | 0 | 2080 | 1590 | 720 | |
| 367 | 1530 | 1530 | 1530 | 2020 | 2020 | 2020 | 1330 | 1150 | 500 | 430 | 160 | 2020 | 1530 | 680 | |
| 292 | 1430 | 1430 | 1430 | 1940 | 1940 | 1940 | 1360 | 1190 | 610 | 420 | 370 | 1940 | 1430 | 630 | |
| 242 | 1370 | 1370 | 1410 | 1870 | 1870 | 1870 | 1380 | 1210 | 650 | 400 | 460 | 1870 | 1370 | 630 | |
| 192 | 1310 | 1310 | 1420 | 1790 | 1790 | 1790 | 1390 | 1220 | 690 | 390 | 540 | 1790 | 1310 | 660 | |
| 177 | 1300 | 1300 | 1420 | 1760 | 1760 | 1760 | 1400 | 1230 | 700 | 390 | 550 | 1760 | 1300 | 660 | |
| 67 | 1190 | 1190 | 1390 | 1570 | 1570 | 1570 | 1330 | 1170 | 660 | 380 | 510 | 1570 | 1190 | 590 | |
| 0 | 1120 | 1120 | 1270 | 1430 | 1430 | 1430 | 1250 | 1100 | 540 | 380 | 350 | 1430 | 1120 | 520 | |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

MARK 50 BOMB 10 KT (9-80)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | | | SAFETY RADII | | | | | | | | | |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|------|------|-------------------|------|------|---------------------|------|--------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | HOB |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER** | |
| | | | | | | | | | | | | | | | |
| 5670 | 1170 | 2030 | 2020 | 4450 | 2900 | 7030 | 7270 | 4590 | 4450 | 4130 | 3250 | 4060 | 4340 | 1730 | 577 |
| 5510 | 1140 | 2710 | 1970 | 4460 | 2920 | 7040 | 7280 | 4600 | 4460 | 4140 | 3270 | 4030 | 4230 | 1670 | 527 |
| 5250 | 980 | 2520 | 1860 | 4470 | 2940 | 7050 | 7290 | 4620 | 4480 | 4160 | 3290 | 4010 | 4050 | 1570 | 452 |
| 5060 | 940 | 2420 | 1760 | 4480 | 2960 | 7050 | 7300 | 4630 | 4490 | 4170 | 3300 | 4050 | 3920 | 1520 | 402 |
| 4870 | 900 | 2320 | 1670 | 4490 | 2970 | 7060 | 7300 | 4630 | 4490 | 4180 | 3310 | 4080 | 3780 | 1480 | 352 |
| 4570 | 870 | 2190 | 1560 | 4500 | 2980 | 7060 | 7310 | 4640 | 4500 | 4190 | 3330 | 4010 | 3550 | 1510 | 277 |
| 4370 | 880 | 2090 | 1490 | 4510 | 2990 | 7070 | 7310 | 4650 | 4510 | 4190 | 3330 | 3830 | 3390 | 1520 | 227 |
| 5120 | 550 | 2450 | 1790 | 4480 | 2950 | 7050 | 7300 | 4620 | 4480 | 4170 | 3300 | 4000 | 3960 | 1540 | 417 |
| 4920 | 510 | 2350 | 1700 | 4490 | 2960 | 7060 | 7300 | 4630 | 4490 | 4170 | 3310 | 4030 | 3820 | 1490 | 367 |
| 4630 | 470 | 2210 | 1580 | 4500 | 2980 | 7060 | 7310 | 4640 | 4500 | 4190 | 3320 | 4070 | 3600 | 1500 | 292 |
| 4430 | 480 | 2120 | 1510 | 4510 | 2990 | 7070 | 7310 | 4650 | 4510 | 4190 | 3330 | 3990 | 3440 | 1520 | 242 |
| 4230 | 480 | 2030 | 1430 | 4510 | 2990 | 7070 | 7310 | 4650 | 4510 | 4200 | 3340 | 3700 | 3270 | 1520 | 192 |
| 4170 | 480 | 2010 | 1410 | 4510 | 3000 | 7070 | 7310 | 4650 | 4510 | 4200 | 3340 | 3650 | 3220 | 1520 | 177 |
| 3720 | 790 | 1780 | 1300 | 4310 | 2840 | 7550 | 6950 | 4450 | 4310 | 4010 | 3170 | 3240 | 2850 | 1490 | 67 |
| 3440 | 730 | 1670 | 1190 | 4130 | 2700 | 7180 | 6630 | 4260 | 4130 | 3840 | 3020 | 2990 | 2630 | 1370 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|-------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|--|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIOS & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB | |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | | |
| 0 | 0 | 0 | 590 | 40 | 0 | 1060 | 1490 | 2470 | 0 | 2540 | 0 | 0 | 0 | 0 | 577 | |
| 0 | 0 | 0 | 650 | 110 | 0 | 1020 | 1440 | 2380 | 280 | 2470 | 0 | 0 | 0 | 20 | 527 | |
| 0 | 0 | 0 | 730 | 220 | 310 | 1790 | 1370 | 2250 | 480 | 2360 | 0 | 0 | 0 | 210 | 452 | |
| 440 | 460 | 0 | 770 | 280 | 490 | 1730 | 1310 | 2160 | 560 | 2290 | 0 | 0 | 0 | 290 | 402 | |
| 440 | 450 | 0 | 790 | 340 | 600 | 1680 | 1250 | 2070 | 640 | 2210 | 0 | 0 | 0 | 380 | 352 | |
| 400 | 450 | 130 | 820 | 410 | 700 | 1690 | 1160 | 1930 | 730 | 2090 | 250 | 250 | 0 | 540 | 277 | |
| 390 | 470 | 190 | 810 | 440 | 750 | 1630 | 1100 | 1840 | 780 | 2010 | 170 | 260 | 70 | 630 | 227 | |
| 440 | 430 | 0 | 760 | 260 | 450 | 1750 | 1330 | 2180 | 540 | 2310 | 0 | 0 | 0 | 270 | 417 | |
| 440 | 460 | 0 | 790 | 320 | 570 | 1700 | 1270 | 2090 | 620 | 2230 | 0 | 0 | 0 | 350 | 367 | |
| 410 | 450 | 110 | 810 | 390 | 680 | 1600 | 1180 | 1960 | 720 | 2120 | 210 | 210 | 0 | 510 | 292 | |
| 390 | 470 | 180 | 820 | 430 | 740 | 1650 | 1120 | 1870 | 770 | 2030 | 140 | 260 | 40 | 600 | 242 | |
| 410 | 490 | 230 | 800 | 470 | 780 | 1690 | 1070 | 1780 | 800 | 1940 | 410 | 250 | 130 | 670 | 192 | |
| 420 | 500 | 250 | 800 | 470 | 790 | 1670 | 1050 | 1750 | 800 | 1920 | 430 | 250 | 160 | 680 | 177 | |
| 360 | 420 | 300 | 710 | 390 | 740 | 1720 | 970 | 1660 | 760 | 1720 | 420 | 230 | 250 | 520 | 67 | |
| 300 | 380 | 120 | 670 | 360 | 620 | 1630 | 920 | 1460 | 670 | 1600 | 290 | 230 | 150 | 390 | 0 | |

** Nuclear radiation effects are significant. If troops have history of previous exposure, consult figure 15-8 for modification of risk radii.

MARK 50 BOMB
100 KT
(11-218)

EFFECTS TABLES
(Distances in meters)

PERSONNEL CASUALTIES

| HOB | EXPOSED | | | IN OPEN FOXHOLES | | | IN APC'S | | | IN TANKS | | | IN EARTH SHELTERS | | |
|-----|------------|------------|----------|------------------|------------|----------|------------|------------|----------|------------|------------|----------|-------------------|------------|----------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH |
| | 838 | 1400 | 1400 | 1600 | 330* | 690 | 1170 | 690* | 990 | 1440 | 420* | 750 | 1190 | 0 | 0 |
| 7A8 | 1290 | 1290 | 1640 | 440* | 770 | 1220 | 760* | 1050 | 1490 | 520* | 820 | 1240 | 0 | 40 | 640 |
| 713 | 1150 | 1260 | 1700 | 570* | 860 | 1290 | 860* | 1130 | 1550 | 640* | 910 | 1310 | 80 | 270 | 700 |
| 663 | 1080 | 1300 | 1730 | 640* | 920 | 1330 | 620* | 1180 | 1580 | 710* | 960 | 1350 | 200 | 370 | 810 |
| 613 | 1070* | 1340 | 1760 | 710* | 970 | 1370 | 670* | 1220 | 1620 | 770* | 1010 | 1390 | 500 | 500 | 860 |
| 538 | 1130* | 1390 | 1800 | 790* | 1030 | 1420 | 1030* | 1270 | 1660 | 840* | 1070 | 1440 | 500 | 550 | 930 |
| 4A8 | 1160* | 1420 | 1830 | 830* | 1070 | 1450 | 1080 | 1300 | 1680 | 880* | 1110 | 1470 | 490 | 610 | 970 |
| 614 | 1070* | 1340 | 1760 | 710* | 970 | 1370 | 660* | 1220 | 1620 | 770* | 1010 | 1390 | 490 | 490 | 860 |
| 564 | 1110* | 1370 | 1790 | 760* | 1010 | 1400 | 1010* | 1250 | 1640 | 820* | 1050 | 1420 | 510 | 520 | 910 |
| 4A9 | 1160* | 1420 | 1830 | 830* | 1070 | 1450 | 1070 | 1300 | 1680 | 880* | 1110 | 1460 | 490 | 610 | 970 |
| 439 | 1190* | 1440 | 1850 | 870* | 1100 | 1470 | 1150 | 1330 | 1710 | 920* | 1140 | 1490 | 470 | 650 | 1000 |
| 3A9 | 1320 | 1460 | 1870 | 900* | 130 | 1500 | 1220 | 1350 | 1730 | 950* | 1170 | 1510 | 480* | 690 | 1030 |
| 314 | 1420 | 1490 | 1890 | 940* | 1460 | 1520 | 1280 | 1380 | 1750 | 990* | 1200 | 1540 | 540* | 740 | 1070 |
| 264 | 1270* | 1510 | 1900 | 960* | 1480 | 1540 | 1280 | 1400 | 1760 | 1010* | 1220 | 1550 | 570* | 770 | 1090 |
| 0 | 1270 | 1350 | 1720 | 850* | 1050 | 1380 | 1050* | 1260 | 1600 | 900* | 1090 | 1410 | 500* | 670 | 970 |

PERSONNEL CASUALTIES

MODERATE DAMAGE

SEVERE DAMAGE

| HOB | IN MULTI-STORY BRICK APTS | | | IN WOOD FRAME BUILDINGS | | | 2nd DEGREE BURNS | | WHEELED VEHICLES | | TOWED ARTY | | MULTI STORY BRICK FACTORIES | | |
|-----|---------------------------|------------|----------|-------------------------|------------|----------|------------------|----------------|------------------|------|------------|-----------------|-----------------------------|-----------|------|
| | IMMED PERM | IMMED TRAN | LAT LETH | IMMED PERM | IMMED TRAN | LAT LETH | SUMMER UNIFORM | WINTER UNIFORM | EXPO | SHLD | TANKS | WOOD FRAME BLDG | BRICK APT | FACTORIES | |
| | 838 | 3480 | 3480 | 3480 | 4620 | 4620 | 4620 | 3270 | 2860 | 1300 | 980 | 0 | 0 | 4620 | 3480 |
| 7A8 | 3410 | 3410 | 3410 | 4550 | 4550 | 4550 | 3290 | 2880 | 1410 | 1010 | 560 | 0 | 4550 | 3410 | 1980 |
| 713 | 3300 | 3300 | 3300 | 4450 | 4450 | 4450 | 3320 | 2920 | 1560 | 1000 | 870 | 280 | 4450 | 3300 | 1920 |
| 663 | 3250 | 3250 | 3250 | 4380 | 4380 | 4380 | 3340 | 2940 | 1630 | 990 | 1010 | 580 | 4380 | 3250 | 1900 |
| 613 | 3200 | 3200 | 3200 | 4310 | 4310 | 4310 | 3360 | 2960 | 1690 | 980 | 1120 | 770 | 4310 | 3200 | 1870 |
| 538 | 3110 | 3110 | 3110 | 4200 | 4200 | 4200 | 3380 | 2980 | 1780 | 960 | 1260 | 970 | 4200 | 3110 | 1850 |
| 4A8 | 3050 | 3050 | 3050 | 4120 | 4120 | 4120 | 3390 | 3000 | 1830 | 940 | 1370 | 1070 | 4120 | 3050 | 1850 |
| 614 | 3200 | 3200 | 3200 | 4310 | 4310 | 4310 | 3360 | 2960 | 1690 | 980 | 1120 | 770 | 4310 | 3200 | 1870 |
| 564 | 3140 | 3140 | 3140 | 4240 | 4240 | 4240 | 3370 | 2980 | 1750 | 960 | 1210 | 920 | 4240 | 3140 | 1850 |
| 4A9 | 3050 | 3050 | 3050 | 4120 | 4120 | 4120 | 3390 | 3000 | 1830 | 940 | 1370 | 1070 | 4120 | 3050 | 1850 |
| 439 | 2990 | 2990 | 2990 | 4040 | 4040 | 4040 | 3410 | 3010 | 1880 | 930 | 1470 | 1160 | 4040 | 2990 | 1850 |
| 3A9 | 2930 | 2930 | 2930 | 3950 | 3950 | 3950 | 3420 | 3030 | 1910 | 920 | 1540 | 1230 | 3950 | 2930 | 1840 |
| 314 | 2840 | 2840 | 2840 | 3830 | 3830 | 3830 | 3430 | 3040 | 1940 | 910 | 1560 | 1330 | 3830 | 2840 | 1820 |
| 264 | 2790 | 2790 | 2790 | 3750 | 3750 | 3750 | 3440 | 3050 | 1930 | 900 | 1560 | 1350 | 3750 | 2790 | 1800 |
| 0 | 2530 | 2530 | 2530 | 3250 | 3250 | 3250 | 3440 | 3060 | 1520 | 890 | 1040 | 1010 | 3250 | 2530 | 1530 |

* Subtract 100 meters from the 8,000 rad RD to obtain the approximate 18,000 rad RD.

MARK 50 BOMB 100 KT (11-218)

EFFECTS TABLES (Distances in meters)

| PRECLUDE | | | | SAFETY RADII | | | | | | | | | | | HOB |
|---------------------------------|----------------------------|--------------------|-------|-------------------|-------------|---------------------|-------|-------|-------------------|-------|------|---------------------|------|------|-----|
| I-PSI OVER- PRES- SURE | MOD DAM FIXED BRG | FOREST BLOWDOWN | | WILDLAND FIRES | | UNWARNED EXPOSED | | | WARNED EXPOSED | | | WARNED PROTECTED | | | |
| | | DECID | CONIF | CLASS I | CLASS IV | NEG | MOD | EMER | NEG | MOD | EMER | NEG | MOD | EMER | |
| | | | | | | | | | | | | | | | |
| 108A0 | 2190 | 5950 | 4340 | 11*30 | 6790 | 21790 | 20140 | 12500 | 11000 | 10070 | 7460 | 9580 | 8450 | 3380 | 838 |
| 106A0 | 2150 | 5830 | 4280 | 11130 | 6800 | 21790 | 20140 | 12510 | 11000 | 10080 | 7470 | 9410 | 8310 | 3330 | 788 |
| 103A0 | 2110 | 5660 | 4210 | 11*40 | 6820 | 21790 | 20140 | 12520 | 11010 | 10090 | 7490 | 9140 | 8090 | 3250 | 713 |
| 10190 | 2080 | 5540 | 4160 | 11150 | 6830 | 21800 | 20150 | 12520 | 11020 | 10090 | 7500 | 8980 | 7930 | 3190 | 663 |
| 9990 | 2060 | 5430 | 4090 | 11*60 | 6840 | 21800 | 20150 | 12530 | 11030 | 10100 | 7500 | 8790 | 7780 | 3140 | 613 |
| 9690 | 2050 | 5260 | 3990 | 11 60 | 6850 | 21800 | 20160 | 12530 | 11030 | 10110 | 7510 | 8520 | 7540 | 3060 | 558 |
| 9490 | 2050 | 5130 | 3930 | 11*70 | 6860 | 21810 | 20160 | 12540 | 11040 | 10110 | 7520 | 8330 | 7370 | 3010 | 488 |
| 9990 | 2060 | 5440 | 4090 | 11*60 | 6840 | 21800 | 20150 | 12530 | 11030 | 10100 | 7500 | 8790 | 7780 | 3140 | 614 |
| 9790 | 2050 | 5320 | 4030 | 11 60 | 6840 | 21800 | 20150 | 12530 | 11030 | 10110 | 7510 | 8610 | 7620 | 3090 | 564 |
| 9490 | 2050 | 5130 | 3930 | 11*70 | 6860 | 21810 | 20160 | 12540 | 11040 | 10110 | 7520 | 8340 | 7380 | 3010 | 489 |
| 9290 | 2040 | 5000 | 3860 | 11*70 | 6860 | 21810 | 20160 | 12540 | 11040 | 10120 | 7530 | 8150 | 7210 | 2960 | 439 |
| 9090 | 2020 | 4860 | 3800 | 11180 | 6870 | 21810 | 20160 | 12540 | 11050 | 10120 | 7530 | 7970 | 7050 | 2910 | 389 |
| 8790 | 1980 | 4670 | 3690 | 11*80 | 6870 | 21810 | 20160 | 12550 | 11050 | 10120 | 7540 | 7690 | 6800 | 2820 | 314 |
| 8590 | 1940 | 4550 | 3620 | 11180 | 6880 | 21810 | 20160 | 12550 | 11050 | 10130 | 7540 | 7510 | 6630 | 2760 | 264 |
| 7490 | 1790 | 4120 | 3330 | 11180 | 6880 | 21800 | 20150 | 12540 | 11050 | 10120 | 7540 | 6510 | 5740 | 2430 | 0 |

| SEVERE DAMAGE | | | | | | | | | | | | | | | |
|---------------|------|------------------|-------------------------------|-------|--------------------------|-------|-----------------------------------|------------|------------------------------------|------------------------------|-----------------------------------|------|--------------------------------------|------|-----|
| BRIDGES | | SUPPLY DEPOTS | SURFACE TO AIR MISSILES | | MISSILES & ROCKETS | | HELICOPTERS RANDOMLY PARKED | | RADIO & FIRE CON EQUIP | OPEN GRID RADAR ANT | TRACKED VEHICLES (no tanks) | | RAILROAD BOX & FLAT CARS | | HOB |
| FIXED | FLTG | | EXPO | RVTTD | TVLG | ERECT | CGO TRANS | LT OBSN | | | EXPO | SHLD | LOCO | CARS | |
| 1530 | 1600 | 0 | 2100 | 720 | 1630 | 4070 | 2930 | 4770 | 1620 | 5840 | 0 | 320 | 0 | 940 | 838 |
| 1480 | 1570 | 20 | 2130 | 780 | 1770 | 4410 | 2870 | 4670 | 1720 | 5760 | 0 | 340 | 0 | 1050 | 788 |
| 1430 | 1540 | 270 | 2170 | 850 | 1940 | 4300 | 2770 | 4540 | 1840 | 5620 | 360 | 360 | 0 | 1230 | 713 |
| 1410 | 1520 | 370 | 2190 | 900 | 2030 | 4230 | 2710 | 4440 | 1910 | 5530 | 560 | 560 | 0 | 1350 | 663 |
| 1400 | 1510 | 460 | 2200 | 940 | 2110 | 4160 | 2650 | 4350 | 1970 | 5440 | 730 | 620 | 20 | 1470 | 614 |
| 1400 | 1510 | 570 | 2200 | 1000 | 2210 | 4060 | 2560 | 4210 | 2060 | 5290 | 950 | 640 | 210 | 1640 | 558 |
| 1420 | 1520 | 640 | 2200 | 1040 | 2270 | 3990 | 2500 | 4120 | 2110 | 5190 | 1080 | 640 | 320 | 1730 | 488 |
| 1400 | 1510 | 450 | 2200 | 940 | 2110 | 4160 | 2650 | 4350 | 1970 | 5440 | 730 | 620 | 20 | 1470 | 614 |
| 1390 | 1510 | 540 | 2200 | 980 | 2170 | 4090 | 2590 | 4260 | 2030 | 5340 | 880 | 640 | 150 | 1580 | 564 |
| 1420 | 1520 | 640 | 2200 | 1040 | 2270 | 3990 | 2500 | 4130 | 2100 | 5190 | 1070 | 640 | 320 | 1730 | 489 |
| 1440 | 1540 | 700 | 2180 | 1070 | 2330 | 3930 | 2450 | 4040 | 2140 | 5090 | 1150 | 620 | 430 | 1800 | 439 |
| 1460 | 1550 | 770 | 2160 | 1090 | 2370 | 3860 | 2410 | 3950 | 2160 | 4990 | 1220 | 610 | 530 | 1850 | 389 |
| 1440 | 1520 | 860 | 2120 | 1080 | 2400 | 3750 | 2350 | 3810 | 2180 | 4830 | 1280 | 590 | 670 | 1870 | 314 |
| 1420 | 1480 | 890 | 2080 | 1050 | 2390 | 3670 | 2310 | 3720 | 2170 | 4730 | 1280 | 590 | 740 | 1840 | 264 |
| 1190 | 1250 | 460 | 1820 | 850 | 1900 | 3240 | 2110 | 3280 | 1820 | 4160 | 870 | 570 | 320 | 1130 | 0 |

CHAPTER 14
COLLATERAL DAMAGE AVOIDANCE TABLES

| | | | Page |
|---------------------|-------|----------|------|
| Short Range Cannon | 0.2 | KT | 14-2 |
| Short Range Cannon | 1.0 | KT | 14-2 |
| Medium Range Cannon | 2.0 | KT | 14-3 |
| Medium Range Cannon | 8.0 | KT | 14-3 |
| Free Flight Rocket | 5.0 | KT | 14-4 |
| Free Flight Rocket | 20.0 | KT | 14-4 |
| Guided Missile | 10.0 | KT | 14-5 |
| Guided Missile | 50.0 | KT | 14-5 |
| Guided Missile | 100.0 | KT | 14-6 |
| MARK 50 Bomb | 3.0 | KT | 14-7 |
| MARK 50 Bomb | 10.0 | KT | 14-7 |
| MARK 50 Bomb | 100.0 | KT | 14-8 |

SHORT RANGE CANNON

SHORT RANGE CANNON

.2 KT
(3-10)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

.2 KT
(3-10)

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | | HOB |
|-----|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|-----|-----|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | | |
| 600 | 270 | 480 | 510 | 410 | 0 | 0 | 0 | 0 | 0 | 140 | 270 | 600 | |
| 570 | 310 | 510 | 540 | 440 | 0 | 0 | 0 | 0 | 0 | 210 | 310 | 570 | |
| 540 | 350 | 530 | 560 | 470 | 0 | 0 | 0 | 0 | 0 | 260 | 350 | 540 | |
| 510 | 380 | 550 | 580 | 500 | 90 | 0 | 0 | 0 | 0 | 300 | 380 | 510 | |
| 480 | 410 | 570 | 600 | 530 | 170 | 0 | 0 | 0 | 0 | 340 | 410 | 480 | |
| 450 | 430 | 590 | 620 | 550 | 220 | 0 | 0 | 0 | 0 | 360 | 430 | 450 | |
| 420 | 460 | 610 | 630 | 580 | 260 | 0 | 0 | 0 | 0 | 390 | 460 | 420 | |
| 390 | 480 | 620 | 650 | 600 | 290 | 0 | 0 | 0 | 60 | 410 | 480 | 390 | |
| 360 | 490 | 640 | 660 | 630 | 320 | 0 | 0 | 0 | 130 | 430 | 490 | 360 | |
| 330 | 510 | 650 | 670 | 720 | 350 | 60 | 0 | 0 | 180 | 450 | 510 | 330 | |
| 300 | 520 | 660 | 680 | 760 | 410 | 120 | 0 | 0 | 210 | 470 | 520 | 300 | |
| 270 | 540 | 670 | 690 | 900 | 440 | 160 | 50 | 0 | 240 | 490 | 540 | 270 | |
| 240 | 550 | 680 | 700 | 910 | 470 | 200 | 100 | 0 | 260 | 490 | 550 | 240 | |
| 210 | 550 | 680 | 710 | 890 | 570 | 280 | 140 | 0 | 280 | 500 | 560 | 210 | |
| 180 | 560 | 690 | 710 | 860 | 580 | 350 | 280 | 0 | 290 | 510 | 560 | 180 | |
| 150 | 560 | 690 | 710 | 820 | 560 | 340 | 270 | 160 | 310 | 520 | 570 | 150 | |
| 120 | 560 | 690 | 710 | 770 | 530 | 320 | 250 | 200 | 320 | 530 | 580 | 120 | |
| 90* | 560 | 680 | 710 | 710 | 490 | 290 | 230 | 200 | 320 | 530 | 580 | 90* | |
| 60 | 550 | 670 | 700 | 640 | 450 | 270 | 210 | 200 | 330 | 530 | 580 | 60 | |
| 30 | 530 | 650 | 680 | 570 | 400 | 240 | 190 | 190 | 330 | 540 | 590 | 30 | |
| 1 | 490 | 610 | 630 | 500 | 350 | 220 | 170 | 160 | 250 | 400 | 430 | 1 | |

1 KT
(5-24)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

1 KT
(5-24)

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | | HOB |
|-----|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|-----|-----|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | | |
| 600 | 650 | 850 | 1150 | 1480 | 700 | 110 | 0 | 0 | 500 | 900 | 990 | 600 | |
| 570 | 680 | 870 | 1170 | 1520 | 730 | 210 | 0 | 0 | 530 | 920 | 1000 | 570 | |
| 540 | 700 | 870 | 1180 | 1680 | 810 | 270 | 0 | 0 | 560 | 940 | 1020 | 540 | |
| 510 | 720 | 900 | 1200 | 1910 | 840 | 320 | 110 | 0 | 590 | 960 | 1030 | 510 | |
| 480 | 740 | 920 | 1210 | 1930 | 870 | 360 | 190 | 0 | 610 | 970 | 1050 | 480 | |
| 450 | 760 | 930 | 1220 | 1940 | 900 | 400 | 240 | 0 | 630 | 990 | 1060 | 450 | |
| 420 | 780 | 950 | 1230 | 1930 | 940 | 460 | 290 | 0 | 650 | 1000 | 1070 | 420 | |
| 390 | 800 | 1140 | 1240 | 1910 | 1150 | 530 | 330 | 0 | 670 | 1010 | 1080 | 390 | |
| 360 | 810 | 1160 | 1250 | 1880 | 1160 | 720 | 390 | 0 | 690 | 1020 | 1090 | 360 | |
| 330 | 820 | 1170 | 1260 | 1840 | 1170 | 740 | 500 | 0 | 700 | 1030 | 1100 | 330 | |
| 300 | 860 | 1160 | 1260 | 1790 | 1170 | 730 | 610 | 0 | 710 | 1040 | 1110 | 300 | |
| 270 | 840 | 1140 | 1270 | 1740 | 1160 | 710 | 610 | 280 | 720 | 1050 | 1120 | 270 | |
| 240 | 840 | 1100 | 1280 | 1680 | 1110 | 690 | 580 | 420 | 730 | 1050 | 1130 | 240 | |
| 210 | 850 | 1060 | 1280 | 1610 | 1070 | 670 | 550 | 450 | 740 | 1060 | 1130 | 210 | |
| 180 | 850 | 1020 | 1280 | 1540 | 1030 | 640 | 530 | 450 | 750 | 1070 | 1140 | 180 | |
| 150 | 850 | 1010 | 1290 | 1460 | 980 | 610 | 510 | 460 | 760 | 1070 | 1140 | 150 | |
| 120 | 850 | 1010 | 1290 | 1380 | 940 | 590 | 490 | 460 | 760 | 1070 | 1140 | 120 | |
| 90* | 850 | 1020 | 1290 | 1300 | 880 | 560 | 470 | 450 | 770 | 1080 | 1150 | 90* | |
| 60 | 830 | 920 | 1300 | 1220 | 830 | 530 | 440 | 430 | 770 | 1080 | 1150 | 60 | |
| 30 | 810 | 960 | 1150 | 1140 | 770 | 490 | 420 | 410 | 680 | 960 | 1020 | 30 | |
| 1 | 760 | 910 | 1000 | 1060 | 720 | 460 | 390 | 370 | 580 | 820 | 880 | 1 | |

* Typical HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

MEDIUM RANGE CANNON

MEDIUM RANGE CANNON

2 KT
(6-38)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

2 KT
(6-38)

| PERSONNEL INJURY [5% incidence] | | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | |
|--------------------------------------|-------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|------|
| HOB | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | HOB |
| 600 | 920 | 1320 | 2040 | 2870 | 1320 | 550 | 320 | 0 | 1010 | 1480 | 1570 | 600 |
| 570 | 950 | 1360 | 2050 | 2890 | 1360 | 600 | 380 | 0 | 1040 | 1500 | 1590 | 570 |
| 540 | 1160 | 1410 | 2070 | 2880 | 1410 | 650 | 430 | 0 | 1060 | 1510 | 1610 | 540 |
| 510 | 1200 | 1740 | 2080 | 2870 | 1740 | 760 | 480 | 0 | 1080 | 1530 | 1620 | 510 |
| 480 | 1220 | 1770 | 2090 | 2840 | 1770 | 810 | 530 | 0 | 1100 | 1540 | 1630 | 480 |
| 450 | 1230 | 1780 | 2100 | 2800 | 1780 | 1110 | 830 | 0 | 1120 | 1560 | 1650 | 450 |
| 420 | 1240 | 1800 | 2110 | 2760 | 1790 | 1120 | 880 | 0 | 1130 | 1570 | 1660 | 420 |
| 390 | 1310 | 1800 | 2110 | 2710 | 1800 | 1120 | 940 | 0 | 1150 | 1580 | 1670 | 390 |
| 360 | 1290 | 1780 | 2120 | 2650 | 1780 | 1100 | 940 | 180 | 1160 | 1590 | 1680 | 360 |
| 330 | 1280 | 1780 | 2130 | 2580 | 1730 | 1070 | 920 | 540 | 1180 | 1600 | 1690 | 330 |
| 300 | 1260 | 1690 | 2140 | 2510 | 1690 | 1050 | 880 | 660 | 1190 | 1610 | 1690 | 300 |
| 270 | 1230 | 1640 | 2140 | 2430 | 1640 | 1020 | 850 | 690 | 1200 | 1610 | 1700 | 270 |
| 240 | 1190 | 1500 | 2150 | 2340 | 1590 | 990 | 830 | 700 | 1210 | 1620 | 1710 | 240 |
| 210 | 1150 | 1540 | 2150 | 2250 | 1540 | 950 | 800 | 710 | 1210 | 1630 | 1710 | 210 |
| 180 | 1140 | 1480 | 2160 | 2160 | 1480 | 920 | 770 | 710 | 1220 | 1630 | 1720 | 180 |
| 150* | 1140 | 1420 | 2160 | 2060 | 1420 | 890 | 740 | 710 | 1230 | 1640 | 1720 | 150* |
| 120 | 1130 | 1360 | 2160 | 1970 | 1360 | 850 | 720 | 700 | 1230 | 1640 | 1730 | 120 |
| 90 | 1120 | 1320 | 2160 | 1870 | 1290 | 810 | 690 | 690 | 1230 | 1640 | 1730 | 90 |
| 60 | 1110 | 1310 | 2090 | 1770 | 1220 | 770 | 660 | 660 | 1180 | 1580 | 1660 | 60 |
| 30 | 1080 | 1270 | 1930 | 1670 | 1150 | 730 | 620 | 630 | 1080 | 1450 | 1530 | 30 |
| 1 | 1020 | 1210 | 1780 | 1580 | 1080 | 690 | 590 | 570 | 980 | 1320 | 1400 | 1 |

8 KT
(9-74)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

8 KT
(9-74)

| PERSONNEL INJURY [5% incidence] | | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | |
|--------------------------------------|-------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|------|
| HOB | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | HOB |
| 600 | 420 | 3370 | 4310 | 4710 | 3330 | 2090 | 1820 | 0 | 2310 | 2790 | 2880 | 600 |
| 570 | 400 | 3330 | 4320 | 4640 | 3300 | 2060 | 1820 | 380 | 2320 | 2800 | 2890 | 570 |
| 540 | 390 | 3280 | 4320 | 4570 | 3250 | 2030 | 1780 | 860 | 2340 | 2810 | 2900 | 540 |
| 510 | 2370 | 3220 | 4330 | 4500 | 3190 | 2000 | 1740 | 1180 | 2350 | 2820 | 2910 | 510 |
| 480 | 2340 | 3170 | 4340 | 4420 | 3140 | 1970 | 1710 | 1310 | 2360 | 2840 | 2920 | 480 |
| 450 | 2310 | 3110 | 4340 | 4330 | 3080 | 1930 | 1670 | 1370 | 2370 | 2840 | 2930 | 450 |
| 420 | 2270 | 3060 | 4350 | 4250 | 3030 | 1900 | 1640 | 1400 | 2380 | 2850 | 2940 | 420 |
| 390 | 2220 | 3000 | 4360 | 4150 | 2970 | 1860 | 1610 | 1420 | 2390 | 2860 | 2950 | 390 |
| 360 | 2180 | 2940 | 4360 | 4060 | 2910 | 1820 | 1580 | 1430 | 2400 | 2870 | 2950 | 360 |
| 330 | 2130 | 2870 | 4370 | 3960 | 2850 | 1780 | 1540 | 1430 | 2410 | 2880 | 2960 | 330 |
| 300 | 2080 | 2810 | 4370 | 3850 | 2780 | 1740 | 1510 | 1440 | 2420 | 2880 | 2970 | 300 |
| 270 | 2030 | 2740 | 4370 | 3750 | 2710 | 1700 | 1470 | 1440 | 2420 | 2890 | 2970 | 270 |
| 240 | 1980 | 2670 | 4380 | 3640 | 2640 | 1660 | 1440 | 1430 | 2430 | 2890 | 2980 | 240 |
| 210 | 1930 | 2590 | 4380 | 3530 | 2570 | 1620 | 1410 | 1430 | 2440 | 2900 | 2980 | 210 |
| 180* | 1870 | 2510 | 4380 | 3420 | 2490 | 1570 | 1370 | 1410 | 2440 | 2900 | 2990 | 180* |
| 150 | 1810 | 2430 | 4380 | 3310 | 2410 | 1530 | 1330 | 1390 | 2440 | 2910 | 2990 | 150 |
| 120 | 1750 | 2350 | 4350 | 3200 | 2330 | 1480 | 1290 | 1360 | 2420 | 2880 | 2960 | 120 |
| 90 | 1690 | 2270 | 4260 | 3090 | 2250 | 1430 | 1250 | 1330 | 2360 | 2810 | 2890 | 90 |
| 60 | 1630 | 2180 | 4170 | 2980 | 2160 | 1380 | 1200 | 1290 | 2300 | 2740 | 2820 | 60 |
| 30 | 1570 | 2100 | 4070 | 2870 | 2080 | 1330 | 1160 | 1240 | 2230 | 2660 | 2740 | 30 |
| 1 | 1510 | 2020 | 3980 | 2760 | 2000 | 1280 | 1120 | 1150 | 2170 | 2590 | 2670 | 1 |

* Typical HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

FREE FLIGHT ROCKET

FREE FLIGHT ROCKET

5 KT
(8-59)

COLLATERAL DAMAGE AVOIDANCE TABLES

5 KT
(8-59)

(Distances in meters)

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | THERMAL IGNITION [threshold level] | | | | HOB |
|------|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|---|---------------|--------|---------------------|------|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | |
| 600 | 1850 | 2720 | 3440 | 4080 | 2710 | 1700 | 1270 | 0 | 1810 | 2290 | 2380 | 600 |
| 570 | 1860 | 2740 | 3450 | 4030 | 2720 | 1710 | 1310 | 0 | 1820 | 2300 | 2390 | 570 |
| 540 | 1970 | 2750 | 3460 | 3980 | 2730 | 1710 | 1450 | 0 | 1840 | 2320 | 2410 | 540 |
| 510 | 1970 | 2730 | 3470 | 3920 | 2710 | 1690 | 1460 | 0 | 1850 | 2330 | 2420 | 510 |
| 480 | 1950 | 2600 | 3470 | 3850 | 2680 | 1660 | 1450 | 400 | 1870 | 2340 | 2430 | 480 |
| 450 | 1930 | 2640 | 3480 | 3780 | 2620 | 1630 | 1420 | 830 | 1880 | 2350 | 2440 | 450 |
| 420 | 1910 | 2500 | 3490 | 3700 | 2570 | 1600 | 1380 | 1000 | 1890 | 2360 | 2450 | 420 |
| 390 | 1880 | 2540 | 3500 | 3620 | 2520 | 1570 | 1350 | 1070 | 1910 | 2370 | 2460 | 390 |
| 360 | 1840 | 2400 | 3500 | 3530 | 2470 | 1540 | 1320 | 1100 | 1920 | 2380 | 2470 | 360 |
| 330 | 1800 | 2420 | 3510 | 3440 | 2410 | 1500 | 1290 | 1110 | 1920 | 2390 | 2470 | 330 |
| 300 | 1760 | 2370 | 3510 | 3350 | 2360 | 1460 | 1260 | 1120 | 1930 | 2390 | 2480 | 300 |
| 270 | 1710 | 2310 | 3520 | 3250 | 2290 | 1430 | 1220 | 1130 | 1940 | 2400 | 2490 | 270 |
| 240 | 1670 | 2250 | 3520 | 3150 | 2230 | 1390 | 1190 | 1130 | 1950 | 2400 | 2490 | 240 |
| 210 | 1620 | 2190 | 3520 | 3040 | 2160 | 1350 | 1160 | 1130 | 1950 | 2410 | 2500 | 210 |
| 180* | 1570 | 2110 | 3530 | 2940 | 2090 | 1310 | 1120 | 1120 | 1960 | 2410 | 2500 | 180* |
| 150 | 1510 | 2030 | 3530 | 2830 | 2020 | 1270 | 1090 | 1110 | 1960 | 2420 | 2500 | 150 |
| 120 | 1460 | 1950 | 3530 | 2720 | 1940 | 1220 | 1050 | 1090 | 1970 | 2420 | 2510 | 120 |
| 90 | 1400 | 1880 | 3460 | 2620 | 1860 | 1180 | 1020 | 1060 | 1920 | 2370 | 2450 | 90 |
| 60 | 1380 | 1800 | 3340 | 2510 | 1780 | 1130 | 980 | 1030 | 1840 | 2280 | 2360 | 60 |
| 30 | 1350 | 1720 | 3230 | 2400 | 1710 | 1080 | 930 | 980 | 1760 | 2180 | 2260 | 30 |
| 0 | 1260 | 1640 | 3110 | 2290 | 1630 | 1030 | 900 | 900 | 1680 | 2090 | 2170 | 0 |

20 KT
(9-105)

COLLATERAL DAMAGE AVOIDANCE TABLES

20 KT
(9-105)

(Distances in meters)

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | THERMAL IGNITION [threshold level] | | | | HOB |
|------|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|---|---------------|--------|---------------------|------|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | |
| 600 | 2920 | 3940 | 5710 | 5450 | 2900 | 2510 | 2120 | 1860 | 3040 | 3300 | 3440 | 600 |
| 570 | 2880 | 3890 | 5720 | 5370 | 2850 | 2470 | 2090 | 1880 | 3040 | 3300 | 3450 | 570 |
| 540 | 2840 | 3830 | 5720 | 5280 | 2790 | 2440 | 2060 | 1900 | 3050 | 3400 | 3460 | 540 |
| 510 | 2800 | 3770 | 5730 | 5190 | 2740 | 2400 | 2030 | 1910 | 3060 | 3410 | 3470 | 510 |
| 480 | 2750 | 3700 | 5730 | 5100 | 2680 | 2360 | 2000 | 1920 | 3070 | 3420 | 3470 | 480 |
| 450 | 2710 | 3640 | 5740 | 5010 | 2620 | 2320 | 1970 | 1920 | 3080 | 3430 | 3480 | 450 |
| 420 | 2660 | 3580 | 5740 | 4910 | 2560 | 2290 | 1930 | 1930 | 3090 | 3430 | 3490 | 420 |
| 390 | 2620 | 3520 | 5750 | 4810 | 2500 | 2250 | 1900 | 1930 | 3090 | 3440 | 3490 | 390 |
| 360 | 2570 | 3460 | 5750 | 4710 | 2430 | 2210 | 1870 | 1930 | 3100 | 3440 | 3500 | 360 |
| 330 | 2520 | 3400 | 5750 | 4610 | 2360 | 2170 | 1830 | 1930 | 3100 | 3450 | 3500 | 330 |
| 300 | 2470 | 3330 | 5760 | 4510 | 2290 | 2130 | 1800 | 1920 | 3110 | 3450 | 3510 | 300 |
| 270 | 2420 | 3250 | 5760 | 4410 | 2220 | 2080 | 1770 | 1910 | 3110 | 3460 | 3510 | 270 |
| 240 | 2370 | 3190 | 5760 | 4310 | 2150 | 2040 | 1730 | 1890 | 3120 | 3460 | 3510 | 240 |
| 210* | 2310 | 3100 | 5760 | 4200 | 2070 | 1990 | 1700 | 1870 | 3120 | 3470 | 3520 | 210* |
| 180 | 2250 | 3030 | 5750 | 4100 | 2000 | 1950 | 1660 | 1840 | 3110 | 3460 | 3510 | 180 |
| 150 | 2200 | 2950 | 5690 | 4000 | 1920 | 1900 | 1620 | 1810 | 3080 | 3430 | 3480 | 150 |
| 120 | 2140 | 2870 | 5630 | 3890 | 1840 | 1850 | 1580 | 1780 | 3050 | 3400 | 3450 | 120 |
| 90 | 2080 | 2790 | 5570 | 3790 | 1760 | 1800 | 1540 | 1750 | 3020 | 3360 | 3410 | 90 |
| 60 | 2020 | 2710 | 5510 | 3680 | 1690 | 1750 | 1490 | 1700 | 2990 | 3330 | 3380 | 60 |
| 30 | 1960 | 2640 | 5450 | 3580 | 1610 | 1700 | 1450 | 1630 | 2950 | 3300 | 3350 | 30 |
| 0 | 1900 | 2560 | 5390 | 3470 | 1530 | 1660 | 1420 | 1530 | 2920 | 3260 | 3310 | 0 |

* Typical HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

GUIDED MISSILE

GUIDED MISSILE

10 KT
(9-80)

COLLATERAL DAMAGE AVOIDANCE TABLES (Distances in meters)

10 KT
(9-80)

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | | HOB |
|------|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|------|-----|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | | |
| 577 | 2510 | 3450 | 4590 | 4790 | 4410 | 2140 | 1870 | 990 | 2470 | 2930 | 3010 | 577 | |
| 527 | 2480 | 3320 | 4600 | 4660 | 4330 | 2090 | 1810 | 1360 | 2490 | 2950 | 3030 | 527 | |
| 452 | 2390 | 3220 | 4620 | 4450 | 4190 | 2000 | 1730 | 1490 | 2520 | 2970 | 3050 | 452 | |
| 402* | 2310 | 3130 | 4630 | 4300 | 4090 | 1940 | 1680 | 1510 | 2530 | 2980 | 3060 | 402* | |
| 352 | 2240 | 3020 | 4630 | 4140 | 3990 | 1880 | 1620 | 1520 | 2550 | 3000 | 3080 | 352 | |
| 277 | 2120 | 2850 | 4640 | 3880 | 3830 | 1780 | 1540 | 1530 | 2560 | 3010 | 3090 | 277 | |
| 227 | 2030 | 2730 | 4650 | 3710 | 3700 | 1710 | 1480 | 1520 | 2570 | 3020 | 3100 | 227 | |
| 417 | 2330 | 3160 | 4620 | 4350 | 4120 | 1960 | 1700 | 1510 | 2530 | 2980 | 3060 | 417 | |
| 367 | 2260 | 3050 | 4630 | 4190 | 4020 | 1900 | 1640 | 1520 | 2540 | 2990 | 3070 | 367 | |
| 292 | 2140 | 2890 | 4640 | 3940 | 3860 | 1800 | 1550 | 1530 | 2560 | 3010 | 3090 | 292 | |
| 242* | 2060 | 2770 | 4650 | 3760 | 3740 | 1730 | 1500 | 1520 | 2570 | 3020 | 3100 | 242* | |
| 192 | 1970 | 2640 | 4650 | 3580 | 3620 | 1650 | 1400 | 1500 | 2580 | 3020 | 3100 | 192 | |
| 177 | 1940 | 2600 | 4650 | 3530 | 3580 | 1630 | 1420 | 1490 | 2580 | 3030 | 3100 | 177 | |
| 67 | 1710 | 2310 | 4450 | 3130 | 3280 | 1450 | 1270 | 1380 | 2450 | 2870 | 2950 | 67 | |
| 0 | 1580 | 2120 | 4260 | 2880 | 3100 | 1350 | 1180 | 1210 | 2320 | 2730 | 2800 | 0 | |

50 KT
(11-159)

COLLATERAL DAMAGE AVOIDANCE TABLES (Distances in meters)

50 KT
(11-159)

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | | HOB |
|------|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|------|-----|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | | |
| 737 | 3990 | 5350 | 8690 | 7350 | 6300 | 3610 | 2920 | 2840 | 4100 | 4350 | 4370 | 737 | |
| 687 | 3920 | 5250 | 8700 | 7200 | 6210 | 3550 | 2870 | 2860 | 4110 | 4360 | 4380 | 687 | |
| 612 | 3810 | 5100 | 8710 | 6960 | 6050 | 3440 | 2780 | 2880 | 4130 | 4380 | 4400 | 612 | |
| 562* | 3730 | 5000 | 8720 | 6800 | 5950 | 3370 | 2730 | 2880 | 4150 | 4390 | 4410 | 562* | |
| 512 | 3650 | 4890 | 8720 | 6630 | 5840 | 3300 | 2670 | 2890 | 4160 | 4400 | 4420 | 512 | |
| 437 | 3530 | 4710 | 8730 | 6370 | 5670 | 3190 | 2590 | 2880 | 4170 | 4420 | 4440 | 437 | |
| 387 | 3440 | 4590 | 8730 | 6200 | 5550 | 3120 | 2530 | 2870 | 4180 | 4420 | 4450 | 387 | |
| 464 | 3570 | 4780 | 8730 | 6460 | 5740 | 3230 | 2620 | 2890 | 4170 | 4410 | 4430 | 464 | |
| 414 | 3490 | 4660 | 8730 | 6290 | 5620 | 3160 | 2560 | 2880 | 4180 | 4420 | 4440 | 414 | |
| 339 | 3350 | 4470 | 8740 | 6030 | 5430 | 3040 | 2470 | 2840 | 4190 | 4430 | 4450 | 339 | |
| 289* | 3260 | 4340 | 8740 | 5860 | 5310 | 2960 | 2410 | 2810 | 4190 | 4440 | 4460 | 289* | |
| 239 | 3160 | 4210 | 8710 | 5680 | 5180 | 2870 | 2340 | 2760 | 4190 | 4430 | 4450 | 239 | |
| 164 | 3010 | 4020 | 8640 | 5420 | 4980 | 2740 | 2240 | 2670 | 4160 | 4400 | 4430 | 164 | |
| 114 | 2910 | 3880 | 8590 | 5240 | 4850 | 2650 | 2170 | 2610 | 4150 | 4390 | 4410 | 114 | |
| 0 | 2680 | 3590 | 8470 | 4830 | 4550 | 2450 | 2010 | 2300 | 4100 | 4340 | 4360 | 0 | |

* Preset HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

GUIDED MISSILE

GUIDED MISSILE

100 KT
(11-218)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

100 KT
(11-218)

| PERSONNEL INJURY [5% incidence] | | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | |
|--------------------------------------|-------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|-----|
| HOB | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | HOB |
| 838 | 5130 | 6840 | 12500 | 9330 | 6790 | 4820 | 3770 | 3960 | 5230 | 5370 | 5350 | 838 |
| 788 | 5050 | 6740 | 12510 | 9170 | 6680 | 4750 | 3710 | 3980 | 5250 | 5380 | 5370 | 788 |
| 713 | 4930 | 6570 | 12520 | 8920 | 6520 | 4630 | 3620 | 3990 | 5270 | 5400 | 5390 | 713 |
| 663 | 4850 | 6460 | 12520 | 8740 | 6410 | 4560 | 3560 | 4000 | 5280 | 5410 | 5400 | 663 |
| 613 | 4770 | 6350 | 12530 | 8570 | 6300 | 4480 | 3510 | 4000 | 5290 | 5430 | 5410 | 613 |
| 538 | 4640 | 6160 | 12530 | 8300 | 6120 | 4360 | 3420 | 3980 | 5310 | 5440 | 5430 | 538 |
| 488 | 4550 | 6040 | 12540 | 8130 | 5990 | 4280 | 3360 | 3970 | 5320 | 5450 | 5430 | 488 |
| 614 | 4770 | 6350 | 12530 | 8570 | 6300 | 4480 | 3510 | 4000 | 5290 | 5430 | 5410 | 614 |
| 564 | 4680 | 6230 | 12530 | 8400 | 6180 | 4400 | 3450 | 3990 | 5300 | 5440 | 5420 | 564 |
| 489 | 4550 | 6040 | 12540 | 8130 | 5990 | 4280 | 3360 | 3970 | 5320 | 5450 | 5430 | 489 |
| 439 | 4450 | 5910 | 12540 | 7950 | 5870 | 4190 | 3300 | 3940 | 5330 | 5460 | 5440 | 439 |
| 389 | 4360 | 5780 | 12540 | 7770 | 5730 | 4100 | 3230 | 3910 | 5330 | 5460 | 5450 | 389 |
| 314 | 4200 | 5580 | 12550 | 7500 | 5530 | 3960 | 3130 | 3830 | 5340 | 5470 | 5460 | 314 |
| 264 | 4100 | 5440 | 12550 | 7320 | 5400 | 3860 | 3060 | 3770 | 5350 | 5480 | 5460 | 264 |
| 0 | 3550 | 4720 | 12540 | 6340 | 4680 | 3350 | 2680 | 3200 | 5350 | 5480 | 5470 | 0 |

• Preset HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

MARK 50 BOMB

MARK 50 BOMB

3 KT
(7-46)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

3 KT
(7-46)

| PERSONNEL INJURY [5% incidence] | | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | THERMAL IGNITION [threshold level] | | | | |
|--------------------------------------|-------|-------|---------|---|-------------------------------|----------------------------|---------------|---|---------------|--------|---------------------|------|
| HOB | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | HOB |
| 525 | 150n | 21n0 | 266n | 338n | 217n | 1340 | 990 | 0 | 1400 | 1880 | 1970 | 525 |
| 475 | 151n | 22n0 | 269n | 331n | 219n | 1320 | 1060 | 0 | 1430 | 1900 | 1990 | 475 |
| 40n | 157n | 21n0 | 270n | 315n | 215n | 1330 | 1150 | 380 | 1470 | 1920 | 2010 | 40n |
| 35n* | 154n | 2070 | 271n | 303n | 207n | 1290 | 1090 | 800 | 1490 | 1940 | 2030 | 350* |
| 30n | 148n | 1990 | 272n | 289n | 199n | 1230 | 1040 | 870 | 1500 | 1950 | 2040 | 30n |
| 225 | 138n | 1850 | 273n | 266n | 184n | 1140 | 970 | 880 | 1530 | 1970 | 2060 | 225 |
| 175 | 130n | 1750 | 274n | 249n | 174n | 1080 | 920 | 880 | 1540 | 1980 | 2070 | 175 |
| 395 | 157n | 2150 | 270n | 314n | 214n | 1330 | 1150 | 450 | 1470 | 1930 | 2020 | 395 |
| 345 | 153n | 2070 | 271n | 302n | 206n | 1290 | 1090 | 810 | 1490 | 1940 | 2030 | 345 |
| 27n | 144n | 1940 | 273n | 280n | 193n | 1200 | 1020 | 880 | 1510 | 1960 | 2050 | 27n |
| 22n* | 137n | 1840 | 273n | 264n | 184n | 1140 | 960 | 880 | 1530 | 1970 | 2060 | 220* |
| 18n | 131n | 1740 | 274n | 251n | 175n | 1090 | 920 | 880 | 1530 | 1980 | 2070 | 18n |
| 95 | 126n | 1660 | 275n | 222n | 155n | 990 | 830 | 850 | 1550 | 1990 | 2070 | 95 |
| 45 | 123n | 1440 | 254n | 204n | 143n | 900 | 770 | 800 | 1410 | 1820 | 1910 | 45 |
| 0 | 114n | 1340 | 232n | 189n | 132n | 840 | 720 | 700 | 1270 | 1650 | 1730 | 0 |

10 KT
(9-80)

COLLATERAL DAMAGE AVOIDANCE TABLES

(Distances in meters)

10 KT
(9-80)

| PERSONNEL INJURY [5% incidence] | | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | THERMAL IGNITION [threshold level] | | | | |
|--------------------------------------|-------|-------|---------|---|-------------------------------|----------------------------|---------------|---|---------------|--------|---------------------|------|
| HOB | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | HOB |
| 577 | 251n | 3450 | 459n | 479n | 341n | 2140 | 1870 | 990 | 2470 | 2930 | 3010 | 577 |
| 527 | 248n | 3360 | 460n | 466n | 333n | 2090 | 1810 | 1360 | 2490 | 2950 | 3030 | 527 |
| 452 | 239n | 3220 | 462n | 445n | 319n | 2000 | 1730 | 1490 | 2520 | 2970 | 3050 | 452 |
| 402* | 231n | 3130 | 463n | 430n | 309n | 1940 | 1680 | 1510 | 2530 | 2980 | 3060 | 402* |
| 352 | 224n | 3020 | 463n | 414n | 299n | 1880 | 1620 | 1520 | 2550 | 3000 | 3080 | 352 |
| 277 | 212n | 2850 | 464n | 388n | 283n | 1780 | 1540 | 1530 | 2560 | 3010 | 3090 | 277 |
| 227 | 203n | 2730 | 465n | 371n | 270n | 1710 | 1480 | 1520 | 2570 | 3020 | 3100 | 227 |
| 417 | 233n | 3160 | 462n | 435n | 312n | 1960 | 1700 | 1510 | 2530 | 2980 | 3060 | 417 |
| 367 | 226n | 3050 | 463n | 419n | 302n | 1900 | 1640 | 1520 | 2540 | 2990 | 3070 | 367 |
| 292 | 214n | 2800 | 464n | 394n | 286n | 1800 | 1550 | 1530 | 2560 | 3010 | 3090 | 292 |
| 242n | 206n | 2770 | 465n | 376n | 274n | 1730 | 1500 | 1520 | 2570 | 3020 | 3100 | 242* |
| 192 | 197n | 2640 | 465n | 358n | 262n | 1660 | 1440 | 1500 | 2580 | 3020 | 3100 | 192 |
| 177 | 194n | 2600 | 465n | 353n | 258n | 1630 | 1420 | 1490 | 2580 | 3030 | 3100 | 177 |
| 67 | 171n | 2310 | 445n | 313n | 228n | 1450 | 1270 | 1380 | 2450 | 2870 | 2950 | 67 |
| 0 | 158n | 2120 | 426n | 288n | 210n | 1350 | 1180 | 1210 | 2320 | 2730 | 2800 | 0 |

* Preset HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

MARK 50 BOMB

MARK 50 BOMB

**100 KT
(11-218)**

COLLATERAL DAMAGE AVOIDANCE TABLES (Distances in meters)

**100 KT
(11-218)**

| HOB | PERSONNEL INJURY [5% incidence] | | | MODERATE DAMAGE TO FACILITIES [5% incidence] | | | | | THERMAL IGNITION [threshold level] | | | HOB |
|------|--------------------------------------|-------|---------|---|-------------------------------|----------------------------|---------------|-----------------|---|--------|---------------------|------|
| | URBAN | RURAL | IN OPEN | SINGLE STORY FRAME BUILDING | SINGLE STORY MASONRY BUILDING | LT STEEL FRAME INDUST BLDG | FIXED BRIDGES | RAIL ROAD EQUIP | WOOD SHINGLES | DRAPES | NEWSPAPERS & DEBRIS | |
| 83A | 5130 | 6840 | 12500 | 9330 | 6790 | 4820 | 3770 | 3900 | 5230 | 5370 | 5350 | 838 |
| 78A | 5050 | 6740 | 12510 | 9170 | 6680 | 4750 | 3710 | 3980 | 5250 | 5380 | 5370 | 788 |
| 713 | 4930 | 6570 | 12520 | 8920 | 6520 | 4630 | 3620 | 3990 | 5270 | 5400 | 5390 | 713 |
| 663* | 4850 | 6460 | 12520 | 8740 | 6410 | 4560 | 3560 | 4000 | 5280 | 5410 | 5400 | 663* |
| 613 | 4770 | 6350 | 12530 | 8570 | 6300 | 4480 | 3510 | 4000 | 5290 | 5430 | 5410 | 613 |
| 53A | 4640 | 6160 | 12530 | 8300 | 6120 | 4360 | 3420 | 3980 | 5310 | 5440 | 5430 | 538 |
| 48A | 4550 | 6040 | 12540 | 8130 | 5990 | 4280 | 3360 | 3970 | 5320 | 5450 | 5430 | 488 |
| 614 | 4770 | 6350 | 12530 | 8570 | 6300 | 4480 | 3510 | 4000 | 5290 | 5430 | 5410 | 614 |
| 564 | 4680 | 6230 | 12530 | 8400 | 6180 | 4400 | 3450 | 3990 | 5300 | 5440 | 5420 | 564 |
| 484 | 4550 | 6040 | 12540 | 8130 | 5990 | 4280 | 3360 | 3970 | 5320 | 5450 | 5430 | 489 |
| 430* | 4450 | 5910 | 12540 | 7950 | 5870 | 4190 | 3300 | 3940 | 5330 | 5460 | 5440 | 439* |
| 389 | 4360 | 5780 | 12540 | 7770 | 5730 | 4100 | 3230 | 3910 | 5330 | 5460 | 5450 | 389 |
| 314 | 4200 | 5580 | 12550 | 7500 | 5530 | 3960 | 3130 | 3850 | 5340 | 5470 | 5460 | 314 |
| 264 | 4100 | 5440 | 12550 | 7320 | 5400 | 3860 | 3060 | 3770 | 5350 | 5480 | 5460 | 264 |
| n | 3550 | 4720 | 12540 | 6340 | 4680 | 3350 | 2680 | 3200 | 5350 | 5480 | 5470 | 0 |

*Preset HOB

NOTE: PERSONNEL INJURY NORMALLY GOVERNS COLLATERAL DAMAGE CONSTRAINTS.

CHAPTER 15
GRAPHS AND TABLES

| | Page | Figure |
|---|----------|--------|
| Area Target Graph - Expected Coverage..... | 15-2 ... | 15-1 |
| Area Target Graph - High Assurance Coverage..... | 15-3 ... | 15-2 |
| Point Target Graph..... | 15-4 ... | 15-3 |
| Point Target Graph Extension..... | 15-4 ... | 15-3 |
| Radii of Vulnerability Table..... | 15-5 ... | 15-4 |
| Comparable Target Table..... | 15-6 ... | 15-5 |
| Residual Radiation Transmission Factors for US Equipment..... | 15-7 ... | 15-6 |
| Radii of Induced Contamination..... | 15-7 ... | 15-7 |
| MSD Modification As A Function of Previous Exposure..... | 15-7 ... | 15-8 |

AREA TARGET GRAPH (EXPECTED COVERAGE)

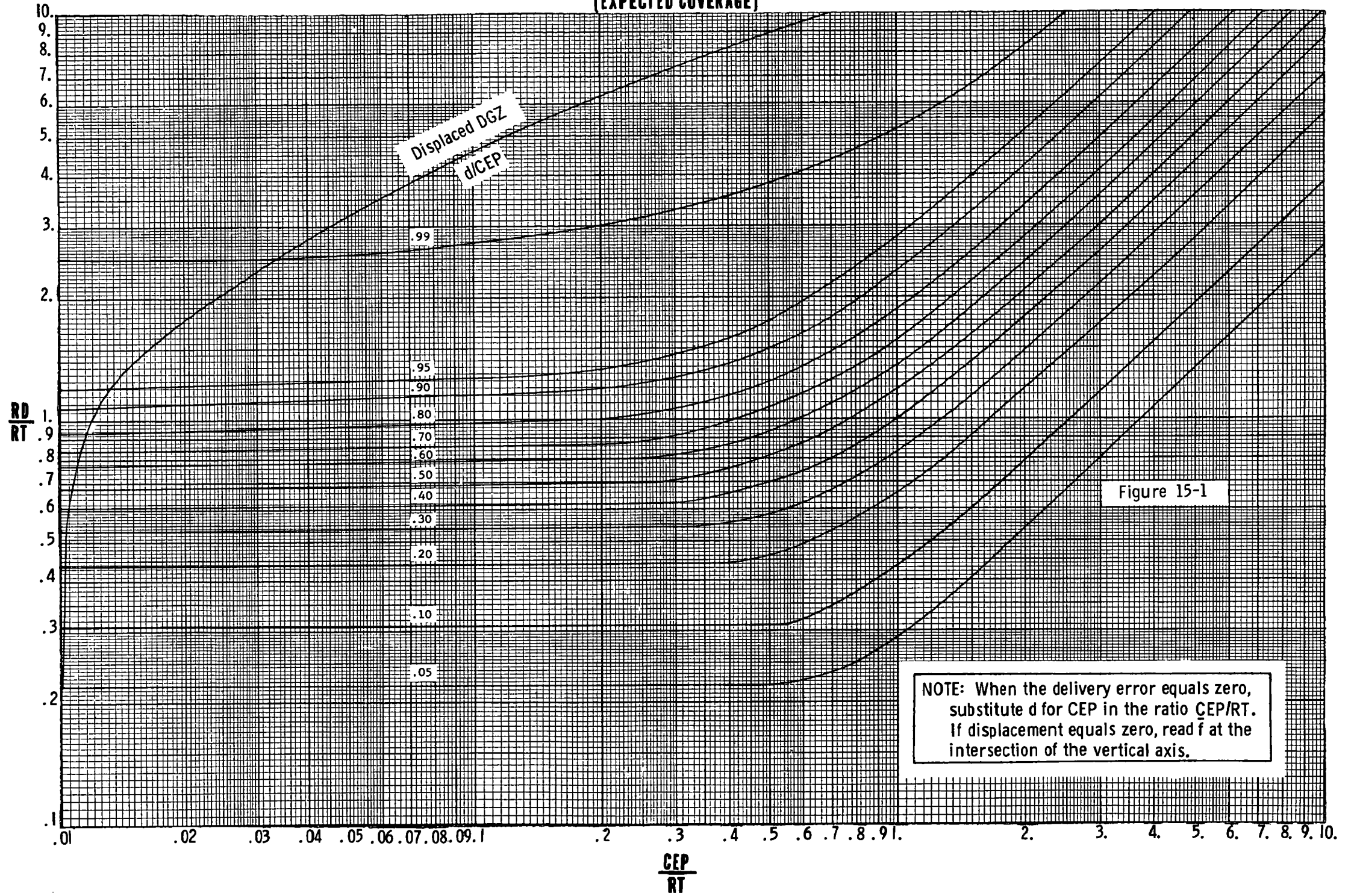


Figure 15-1

AREA TARGET GRAPH

(HIGH ASSURANCE COVERAGE)

GO TO POINT TARGET GRAPH

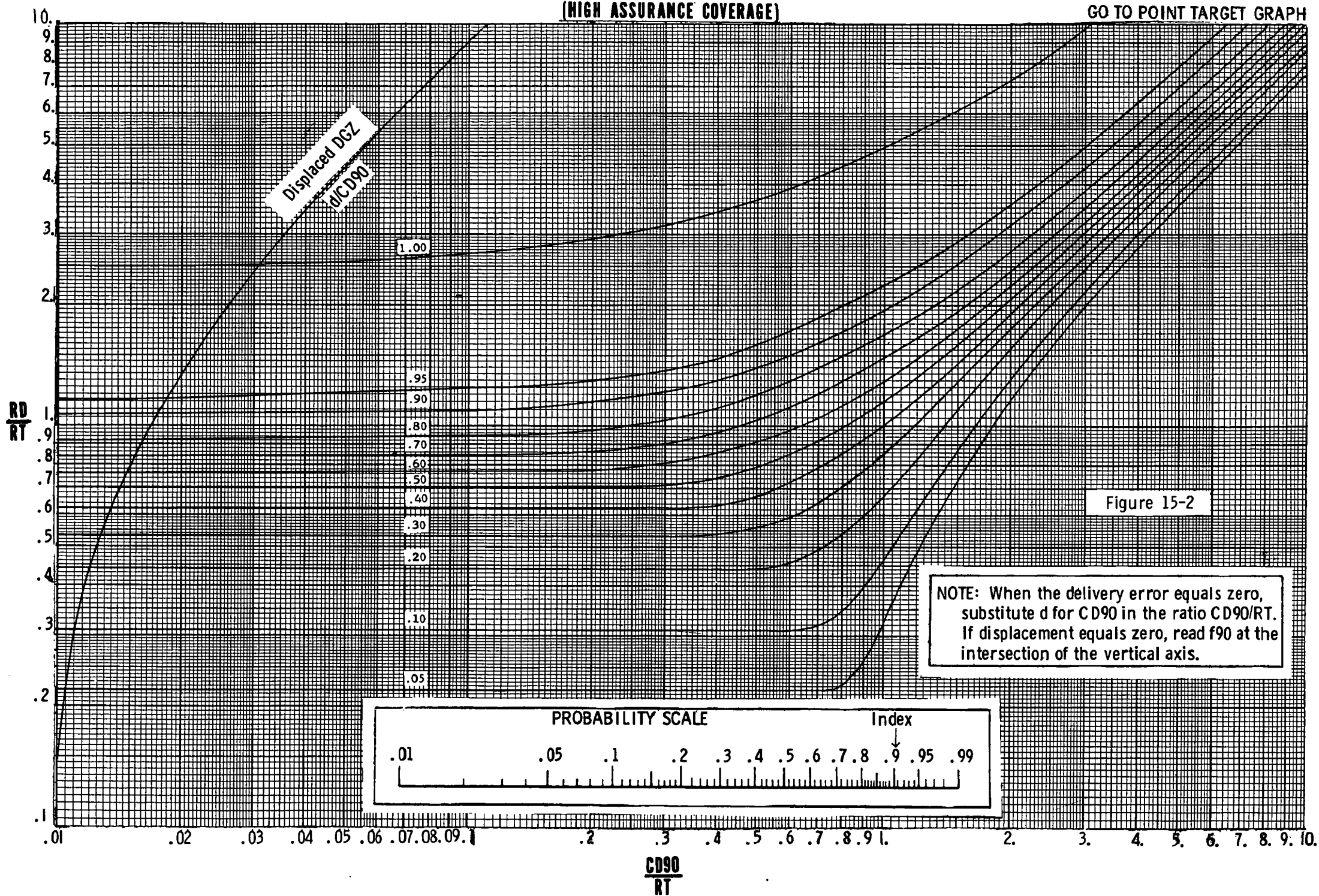
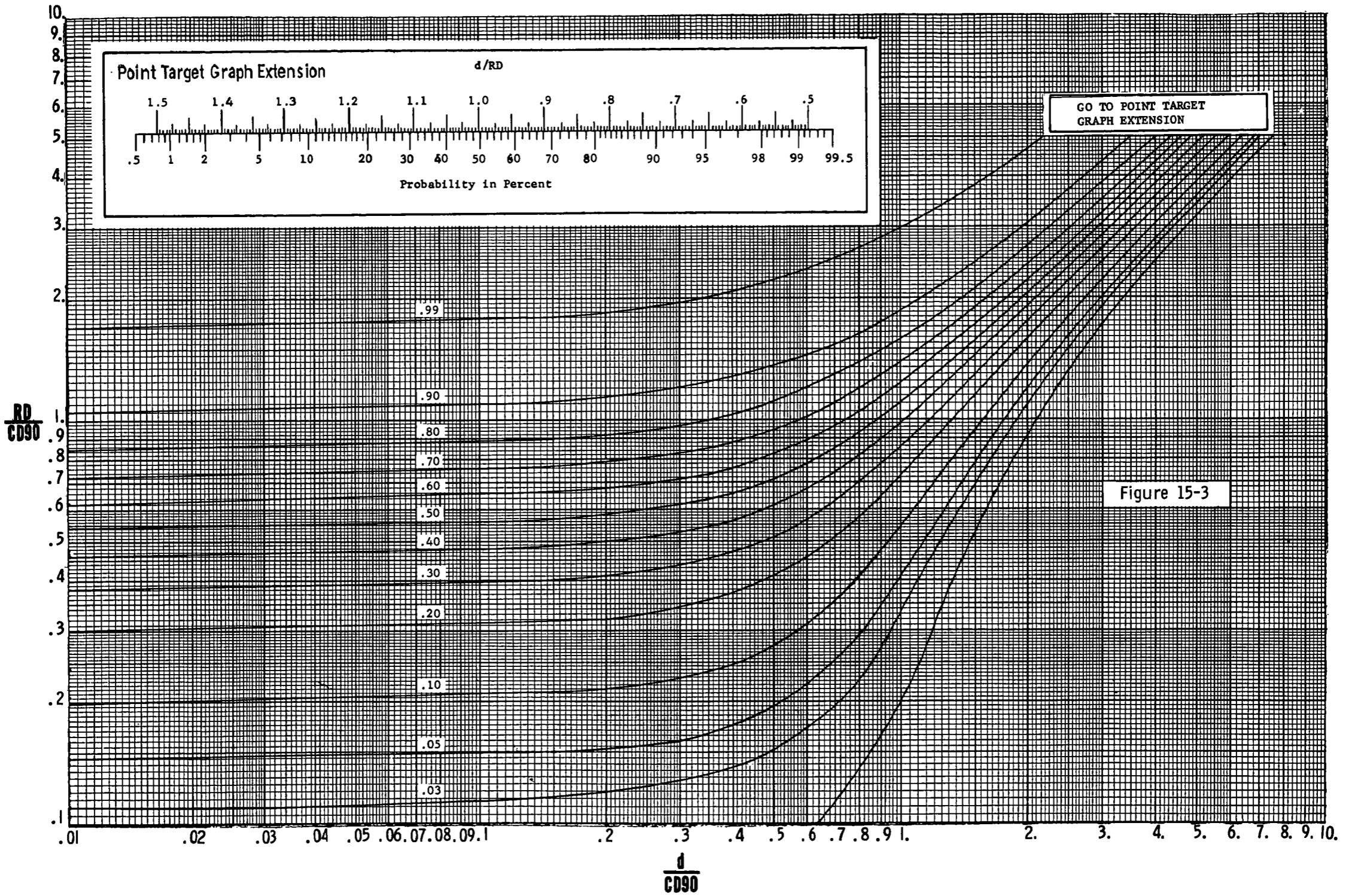


Figure 15-2

NOTE: When the delivery error equals zero, substitute d for CD90 in the ratio CD90/RT. If displacement equals zero, read f90 at the intersection of the vertical axis.

POINT TARGET GRAPH



RADII OF VULNERABILITY

(Distances in meters)

Figure 15-4

| Category Yield (KT) | CASUALTIES TO PERSONNEL IN | | | | | | MODERATE DAMAGE | | | | | | SEVERE DAMAGE | | |
|------------------------|----------------------------|-------|------|------------------|----------------|-----------|------------------|------|------------|---------------------|---------|------|---------------|-----------------------------|------|
| | Open | Tanks | APC | Wheeled Vehicles | Earth Shelters | Fox-holes | Wheeled Vehicles | | Towed Arty | Tanks, APC, SP Arty | Bridges | | Supply Depots | Randomly Parked Helicopters | |
| | | | | | | | Exposed | Shld | | | Hard | Soft | | Cgo/Trans | Obsn |
| 1.0 | 1240 | 890 | 1010 | 1080 | 550 | 840 | 310 | 250 | 220 | 250 | 300 | 400 | 160 | 730 | 1230 |
| 2 | 2080 | 1220 | 1380 | 1480 | 790 | 1170 | 480 | 360 | 330 | 380 | 470 | 640 | 230 | 1060 | 1730 |
| 3 | 2630 | 1370 | 1550 | 1650 | 900 | 1320 | 590 | 420 | 420 | 470 | 580 | 800 | 280 | 1360 | 2330 |
| 5 | 3410 | 1550 | 1720 | 1830 | 1010 | 1470 | 750 | 500 | 540 | 610 | 720 | 1030 | 350 | 1680 | 2880 |
| 10 | 4490 | 1680 | 1900 | 2040 | 1160 | 1680 | 1020 | 640 | 740 | 820 | 1010 | 1470 | 480 | 2160 | 3730 |
| 20 | 5540 | 1710 | 1940 | 2100 | 1230 | 2020 | 1290 | 770 | 920 | 1040 | 1240 | 1740 | 620 | 2630 | 4560 |
| 50 | 8350 | 1990 | 2230 | 2430 | 1480 | 2860 | 1950 | 1100 | 1390 | 1560 | 1711 | 2410 | 960 | 3700 | 6260 |
| 100 | 12000 | 2130 | 2400 | 2640 | 1700 | 3770 | 2710 | 1460 | 1960 | 2210 | 2610 | 3270 | 1350 | 4850 | 8230 |

COMPARABLE TARGET TABLE

Figure 15-5

| PRIMARY TARGET | | | Exposed Personnel LL | Personnel In Open Foxholes IT | Personnel In Tanks IT | Moderate damage To Tanks | Moderate damage To Towed Artillery | Moderate damage To Wheeled Vehicles |
|--|---------------|--------------------|-------------------------|--|-----------------------------|--------------------------------|---|--|
| SECONDARY TARGET | | | | | | | | |
| Factories (25-50 ton Crane Capacity) | All Yields | Severe Damage | | | | ● | | |
| Fixed Bridges | ≤ 55 KT | Severe Damage | | | | | ● | |
| Floating Bridges | < 55 KT | Severe Damage | | | | | ● | |
| Missiles/Rockets In Open | All Yields | Severe Damage | | | | | | ● |
| Railroad Boxcars and Flat Cars (loaded) | All Yields | Severe Damage | | | | | | ● |
| Tracked Vehicles (not tanks) | All Yields | Severe Damage | | | | | ● | |
| Heavy and Self-Propelled Artillery | All Yields | Moderate Damage | | | | ● | | |
| Personnel in Brick Apartment Buildings | < 55 KT | LL | ● | | | | | |
| | ≤ 10 KT | IP | | | ● | | | |
| Personnel in APC | All Yields | IP | | ● | | | | |
| Personnel in Earth Shelters | All Yields | LL | | ● | | | | |

METHODOLOGY FOR OBTAINING OTHER COMPARABLE TABLES

1. The radius of damage for the secondary targets will equal or exceed the radius of damage for the primary target. The coverage for the secondary target will be at least that shown for the corresponding primary target.
2. For secondary targets that have not been tabulated, there is no general relationship between the secondary target response function and a primary target response function. However, there is a methodology with which an approximate coverage can be obtained for some of these secondary targets. If more accurate target analysis is required, the numerical method should be used.

The procedure is outlined below:

- a. From a coverage table of the weapon system and yield being analyzed, determine the height of burst for the gun/launcher-target range.
- b. Use the effects tables to determine the desired radius of damage for the secondary target using the height of burst just selected.
- c. Find the radius of damage for a primary target that comes closest to the secondary radius of damage. (Stay at the same height of burst, yield and system.) For radiation sensitive secondary targets, use only radiation primary targets and for blast sensitive targets, use only blast primary targets.
- d. Enter the coverage table for the primary target category selected and for the radius of target in question, read the appropriate coverage. (If the primary target radius of damage used is less than that of the secondary target, then the coverage to the secondary target will be at least that of the primary target. If the primary target radius of damage used is greater than that of the secondary target, then the coverage to the secondary target will be at most that of the primary target.)

RESIDUAL RADIATION TRANSMISSION FACTORS
FOR US EQUIPMENT

| | |
|--|------|
| M41 Tank | 0.1 |
| M60 Tank | 0.04 |
| M60A2 Tank | 0.03 |
| M48A2 Tank | 0.02 |
| M59 APC | 0.2 |
| M113 APC | 0.3 |
| M116 Cargo Carrier | 0.6 |
| M548 Cargo Carrier | 0.7 |
| M577 Command Post Carrier | 0.3 |
| M108 SP Howitzer | 0.3 |
| M109 SP Howitzer | 0.2 |
| M110 SP Howitzer | 0.4 |
| M106 SP Mortar | 0.3 |
| M125A SP Mortar | 0.3 |
| M107 SP Gun | 0.4 |
| M114 Reconnaissance Vehicle | 0.3 |
| M88 Recovery Vehicle | 0.09 |
| M578 Recovery Vehicle | 0.3 |
| M20 Combat Engineer Vehicle | 0.04 |
| M551 Armored Reconnaissance/ Airborne Assault Vehicle | 0.2 |

Figure 15-6

RADII OF INDUCED CONTAMINATION

Estimated 2 Rad/Hr Dose Rate at H + 1 Hr
Yield Horizontal Radius

| | | |
|------|----|-------------|
| 0.1 | KT | 200 meters |
| 1 | KT | 700 meters |
| 10 | KT | 1000 meters |
| 100 | KT | 1600 meters |
| 1000 | KT | 2000 meters |

NOTE: To determine the approximate distance from ground zero at which radiation measuring instruments should be used, enter the above table at the nearest listed yield.

Figure 15-7

MSD MODIFICATION AS A FUNCTION OF PREVIOUS EXPOSURE

| Radiation Exposure State | Total Past Cumulative Dose (rad) | Commanders Risk Guidance | | |
|--------------------------|----------------------------------|--------------------------|----------|-----------|
| | | Negligible | Moderate | Emergency |
| RES-0 | 0 | NEG | MOD | EMER |
| RES-1 | > 0, ≤ 70 | NEG + 100m | NEG | MOD |
| RES-2 | > 70, ≤ 150 | NEG + 200m | NEG+100m | NEG |
| RES-3 | > 150 | NEG + 300m | NEG+200m | NEG+100m |

Figure 15-8

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APPENDIX A

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APPENDIX B
DUAL FUZING CONSIDERATIONS

General. A timer fuze and a variable time (VT) fuze operate in parallel for medium to maximum range airbursts with the Free Flight Rocket warhead. At short ranges, only the timer fuze operates. This multiple fuzing arrangement improves the effectiveness of this weapon system at the medium and longer ranges. This section presents a discussion of the factors involved in the employment of the dual fuze.

a. Fuzing system description.

- (1) A timer fuze operates throughout the trajectory of the Free Flight Rocket system. Whenever the timer fuze sends a burst command to the warhead, the warhead will detonate.
- (2) After 39 seconds and before 40 seconds time of flight, the VT fuze becomes operable. The VT and timer fuze then operate in parallel. The fuze which operates first will detonate the warhead.
- (3) There is no option of selecting either the timer or VT fuze alone. The changeover from timer only to dual fuzing is accomplished automatically by the fuzing system.
- (4) Troop safety and fallout preclusion considerations require that the nuclear weapons employment officer consider that the VT fuze becomes ready to operate at 40 seconds. This is the basis on which the Free Flight Rocket coverage and safety tables have been developed.

b. The Effectiveness of Dual Fuzing.

- (1) Dual fuzing was devised to increase the damage expectancy on a target at those ranges where the Free Flight Rocket delivery system, using timer fuzing alone, has large vertical errors. When a fallout safe airburst is desired, these large vertical errors significantly reduce the probability of the burst being low enough to produce satisfactory damage radii in the target area. Dual fuzing is more effective than timer or VT fuzing alone, particularly at medium ranges, and it increases the effective range of Free Flight Rocket delivered nuclear warheads.
- (2) The increase in effective range is achieved through the use of a special HOB setting for the timer fuze, while relying on the VT fuze to provide for the preclusion of fallout. The special timer HOB setting is influenced by the timer PEH, the timer PER, and the VT PER. The timer HOB, therefore, vary significantly with range. For a specific range, the special timer HOB setting varies with the yield, the "hardness" of the target, and the size of the target.

c. Dual Fuzing Burst Patterns.

- (1) Viewed in a vertical plane through the axis of the trajectory, the burst patterns of the timer and VT fuzes, acting alone, are shown in Figure B-1. The VT pattern is considerably narrower and more elongated than the timer pattern. Note that the VT fuze pattern extends farther horizontally than the timer fuze pattern (the magnitude of this extension depends upon the angle of fall of the rocket).

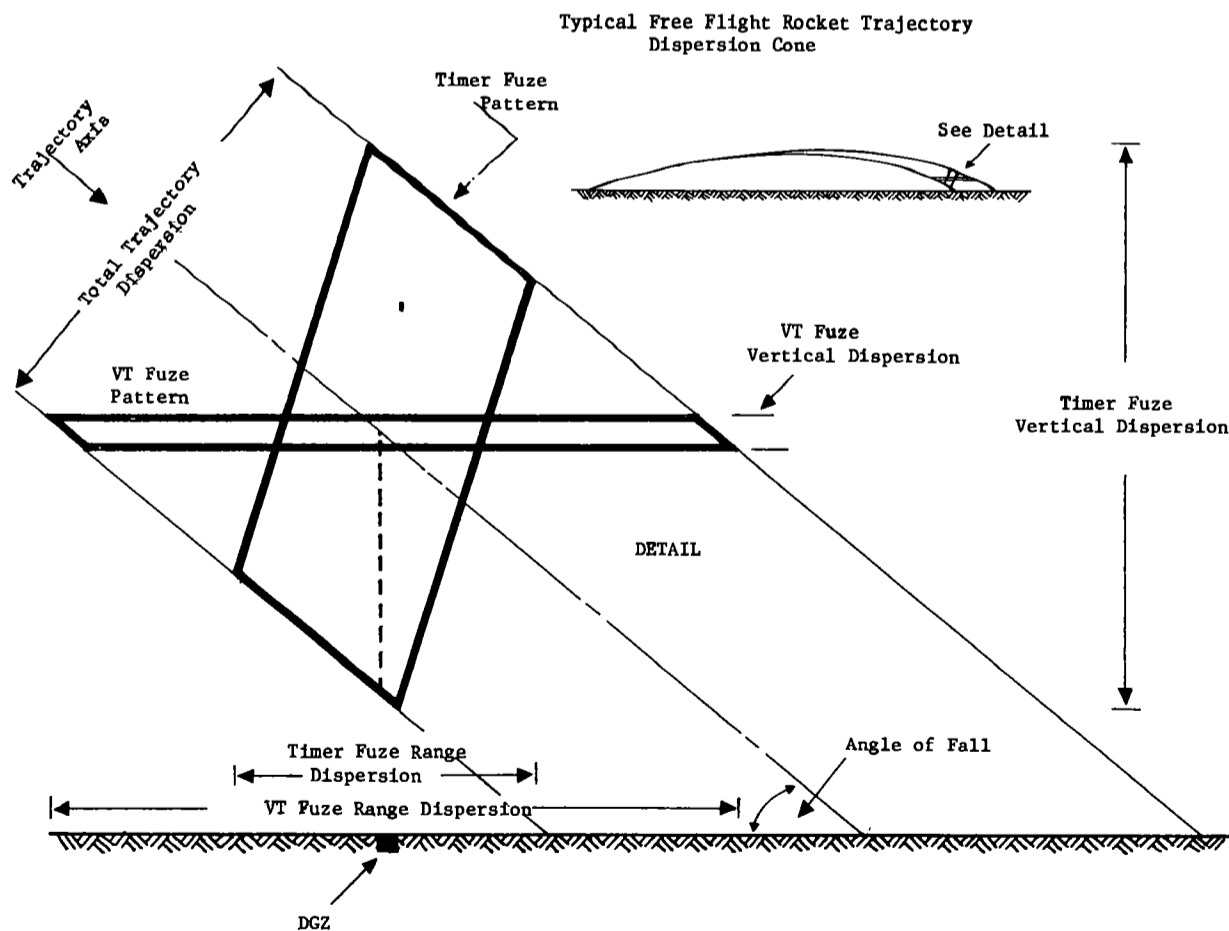


Figure B-1. Burst Patterns

(2) Figure B-1 shows the relationship of the VT fuze and timer fuze burst patterns. Both patterns are shown centered on the same HOB and point in space without reference to the preset VT HOB setting. For simplicity in the following figures, it is assumed that the 4 PE each side of center include the total dispersion.

(3) The location of the rocket path in the dispersion cone of the trajectory and the difference between the timer fuze setting and the VT fuze setting determine whether the detonation is caused by the timer fuze or the VT fuze. Figure B-2 shows a dual fuzing burst pattern. In this example, both fuzes are set for the same height of burst. Note that the VT fuze would detonate those weapons which would otherwise impact or be detonated in the lower portions of the timer fuze airburst pattern. This action of the VT fuze causes the lower portion of the combined fuzing burst pattern to flatten out and elongate in the direction of the launching site. This elongation significantly extends the possible horizontal error of the burst. The elongation of the burst pattern varies with the angle of fall of the rocket (range) and with the difference between the timer and VT HOB settings. At the shorter ranges, where the angle of fall is small (as illustrated in Figure B-2), an increase in the probability of a VT burst increases the elongation of the expected pattern. In order to center the burst pattern over the Desired Ground Zero (DGZ), the delivery unit automatically adds a "range offset" to the launcher-target range in calculating firing data.

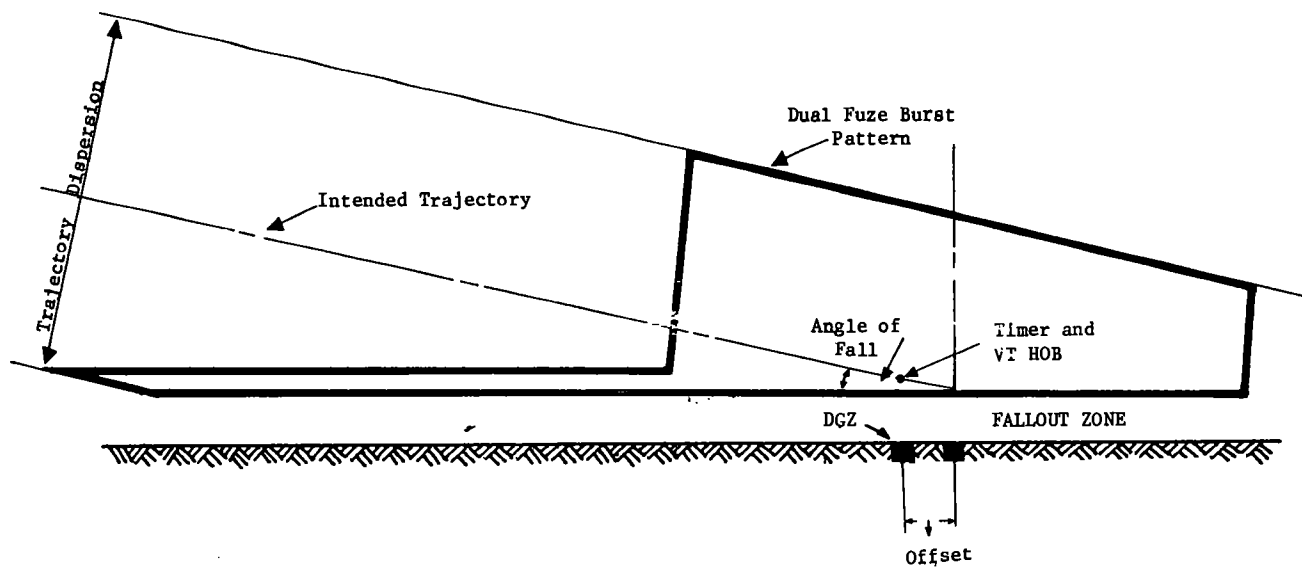


Figure B-2. Dual Fuzing Burst Pattern, Near-Minimum Range.

(4) As the range increases, the timer vertical and range errors increase, while the VT range error decreases. (VT vertical error remains constant.) This progressive change in the three probable errors continues out to maximum range.

(a) Selection of the special HOB setting for the timer fuze involves:

1. Avoiding the larger VT range error at the beginning of the dual fuzing range.
2. Avoiding the larger timer vertical error at the longer ranges.
3. Selecting the best combination of these errors for the ranges in between these extremes. This combination considers the requirement to hit the target (influenced by range errors) while achieving an acceptable radius of damage (influenced by vertical errors).

(b) Figure B-3 illustrates the relative size and shape of the dual fuzing burst pattern at an intermediate range where the timer fuze HOB is calculated to be below ground level at the target. In this case, most rounds will burst on signal from the VT fuze. Note that the elongation of the lower portion of the pattern is significantly less than the elongation at the shorter range.

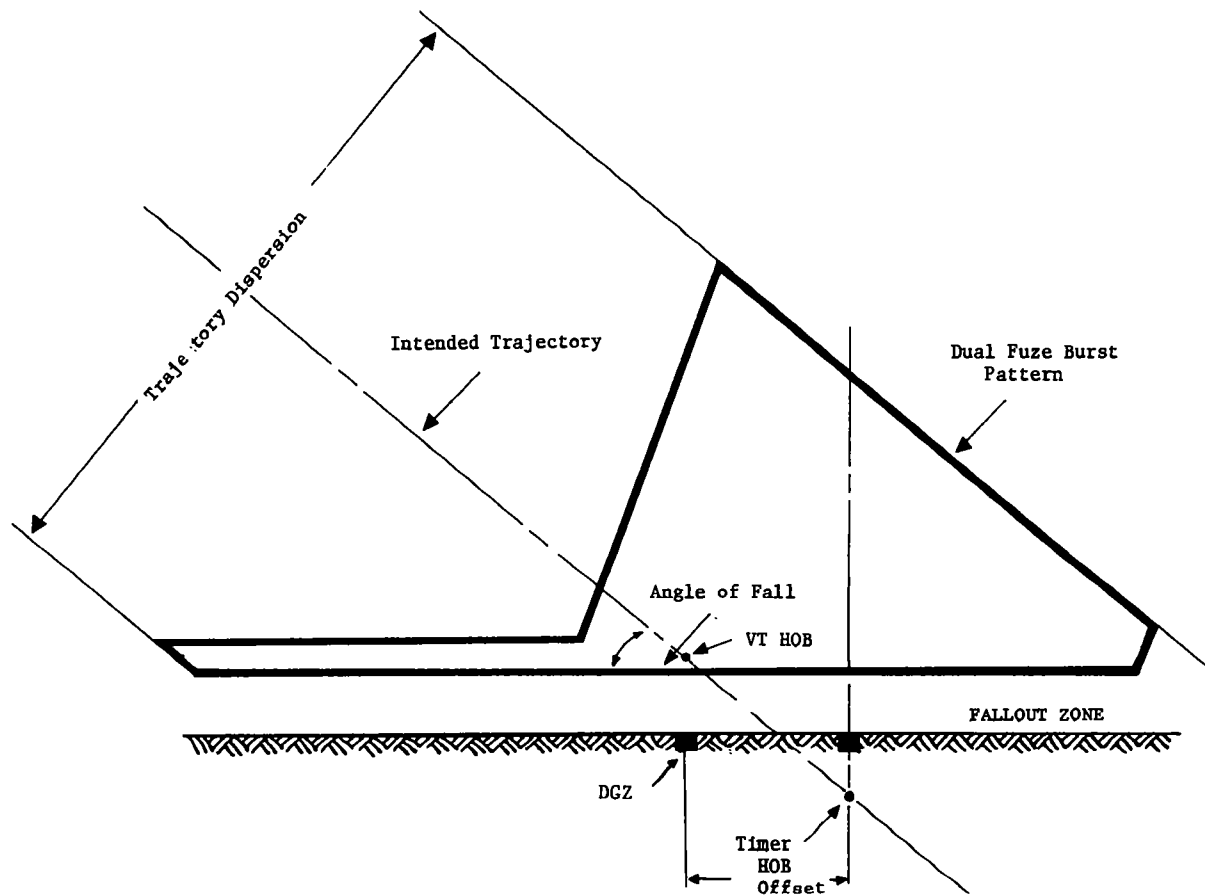


Figure B-3. Dual Fuzing Burst Pattern, Intermediate Range.

(5) Figure B-4 illustrates the combined fuzing burst pattern expected at near-maximum range with the timer fuze HOB calculated to be well below ground level at the target. Note that at this range the elongation of the burst pattern toward the launching site is small and that, as shown by Figure B-1, the vertical dispersion is greatly reduced when compared with the burst pattern produced by the timer fuze alone.

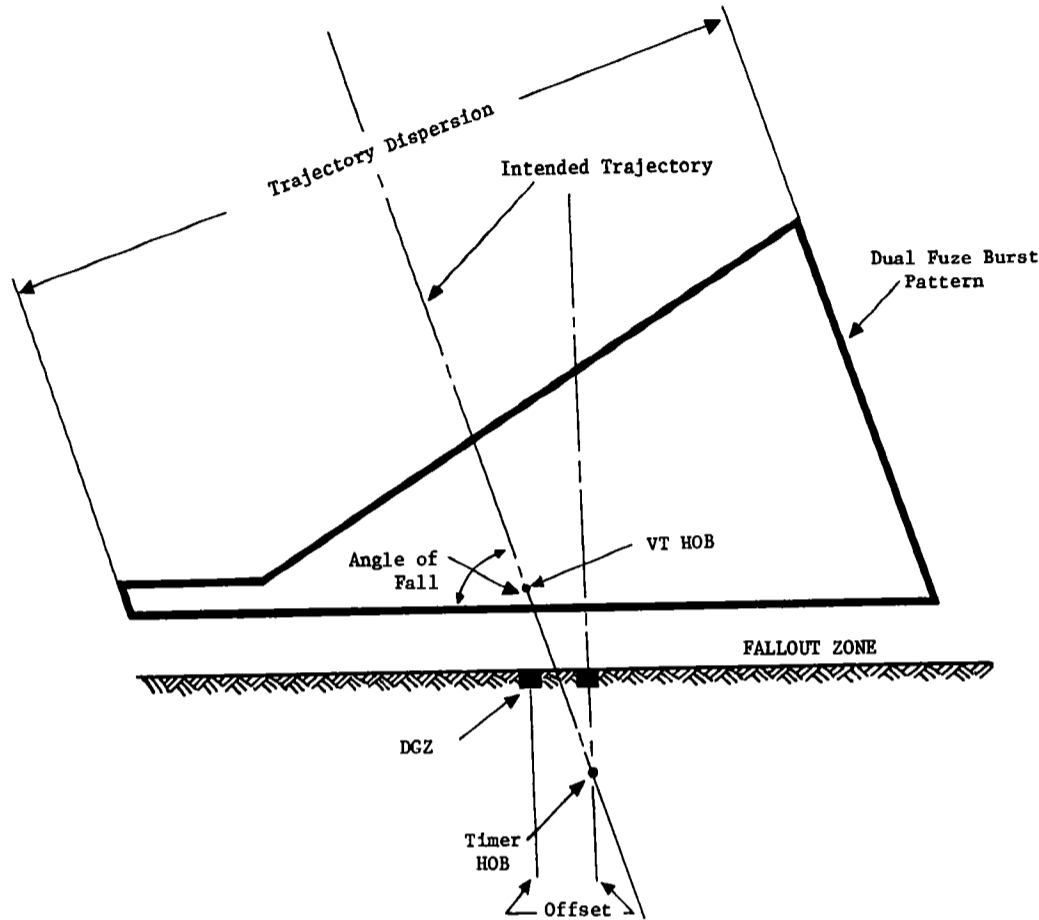


Figure B-4. Dual Fuzing Burst Pattern, Near-Maximum Range.

(6) At the longer ranges, it is desirable to detonate the weapon only by the VT fuze. However, the design of the parallel fuzing limits the distance the timer fuze can be set below the VT.

(7) The special timer HOB setting for each range has been precomputed and used in the computation of the Coverage and Safety Tables. These HOB have been computed using the following formulae:

Table B-1. FREE FLIGHT Rocket

| Yield(KT) | VT HOB (Fixed) | Timer HOB |
|-----------|----------------|--|
| 5.0 | 230m | 500 meters minus 10 times range in kilometers. |
| 20.0 | 260m | 550 meters minus 10 times range in kilometers. |

d. Coordination Procedures When Employing Dual Fuzing.

(1) Different procedures are established for coordination between the fire support element (FSE) and fire direction center (FDC) for each of the three situations that exist when a dual fuzing system is employed. These three situations are:

- (a) Relatively short ranges at which timer fuze only is operable.
- (b) Relatively long ranges at which timer fuze and VT fuze operate in parallel.
- (c) Crossover ranges at which either timer fuze only or dual fuze may operate.

(2) When the weapon is being fired at a range where only the timer fuze is expected to operate (time of flight less than 40 seconds), the artillery fire direction center is given the desired height of burst above DGZ in meters, and the FDC computes the firing data without considering the range offset.

(3) When the weapon is fired at a range where the timer fuze and the radar fuze are expected to operate in parallel (time of flight greater than 40 seconds), the FDC determines the range offset and the timer height of burst from appropriate tables. The firing data are computed using the range to target plus range offset and timer height of burst.

e. Precautions When Employing Dual Fuzing. A possible hazardous situation exists when employing systems with dual fuzing. Suppose the estimated time of flight for Free Flight Rocket is calculated to be 40.2 seconds. Errors in the determination and application of ballistic factors, especially air density and upper winds, could cause the actual time of flight to be less than 40 seconds, for example, 39.8 seconds.

(1) In this example, the analyst would select the HOB for the dual fuze. Because of the shorter time of flight to the target resulting from an error in ballistic correction, the VT element of the fuze might not operate. The HOB for the timer element is considerably lower than that required for a very high assurance of no fallout with timer only. The change in time of flight substantially increases the probability of fallout.

(2) It is desirable to seek times of flight which are not close to the expected fuze crossover point. This can be done by selecting launcher positions which will provide times of flight not close to 40 seconds. Changes in times of flight due to uncorrected low-level wind variations of the intensities likely to be encountered in a tactical firing are ignored due to the lack of a feasible method of correcting them.

f. A 90% HOB bracket has been included in the Coverage Tables for those ranges where either fuze may function. This bracket represents the vertical space within which a round has a 90% probability of bursting. These data may be used when analyzing a situation not covered by this manual to determine a probable RD.

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APPENDIX C

BLACKOUT EFFECTS OF NUCLEAR DETONATIONS ON RADIO COMMUNICATIONS AND RADAR TRANSMISSION/RECEPTION

1. Tactical commanders should be aware that the fireball and dust clouds resulting from a nuclear burst may degrade or completely interrupt the operation of their radio communications systems and radars without doing physical harm to their equipment. This interference results from:
 - a. Absorption or changes in the characteristics of electromagnetic (EM) waves from a communications transmitter or radar set as a result of their interaction with the fireball or dust cloud.
 - b. EM radiation from the fireball being picked up by the receiver.
2. The durations of these effects are of chief interest and are summarized in Table C-1 for communications systems. Interference from low altitude bursts may last from a few seconds to a few minutes for most communications systems. That produced by high altitude bursts may range from a few seconds to hours. The duration of such interference for radar systems is comparable.
3. Increasing transmitter power or the use of alternate routing may be employed to mitigate blackout effects to radio communications. Alternate routing may be difficult since communications traffic is apt to be very heavy during the time of nuclear conflict. When a frequency is blacked out in a system that can transmit at several frequencies, other frequencies should be tried.

| BURST REGION | MODE OF PROPAGATION | FREQUENCY BANDS | BLACKOUT SOURCE | ESTIMATED DURATION OF BLACKOUT |
|---------------|------------------------|-----------------|-----------------|---------------------------------|
| Near Surface | Line of Sight | VHF, UHF, SHF | Dust/Fireball | Few seconds to few minutes. |
| Near Surface | Satellite Relay | UHF, SHF | Dust/Fireball | Few seconds to tens of seconds. |
| Low Altitude | Troposcatter | UHF, SHF | Dust/Fireball | Few seconds to tens of seconds. |
| Low Altitude | HF Groundwave, Skywave | HF, VHF | Fireball | Negligible to few seconds. |
| Low Altitude | Satellite Relay | UHF, SHF | Dust/Fireball | Few seconds to tens of seconds. |
| High Altitude | Troposcatter | UHF | Ionized Region | Few seconds to minutes. |
| High Altitude | HF Skywave | HF | Ionized Region | Minutes to many hours. |
| High Altitude | Satellite Relay | UHF, SHF | Ionized Region | Few minutes to hours. |

Table C-1. Blackout of Radio Communications Due to Nuclear Bursts

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APPENDIX D

VULNERABILITY OF ARMY TACTICAL EQUIPMENT TO EMP

1. In addition to casualties and equipment damage caused by initial radiation, blast and thermal radiation, a unit may receive damage to some of its electrical and electronic equipment due to the effects of electromagnetic pulse (EMP). A brief description of EMP effects is contained in Appendices B and C of FM 101-31-1.
2. Because of the uncertainties involved, EMP is not considered a reliable kill mechanism for targeting purposes; however, EMP effects can be significant for friendly unit vulnerability and damage preclusion considerations.
3. Army tactical equipment which is vulnerable to EMP can be divided into four categories based on the vulnerability of the equipment. These categories and associated vulnerabilities are given in Table D-1. Table D-2 gives the probable safe radii and probable damage radii for low air/surface bursts as a function of yield for the two most vulnerable categories of equipment contained in Table D-1. Such information is not provided for the other categories of equipment since it is expected that such equipment will be damaged or operating crews will be incapacitated due to exposure to initial radiation, blast, or thermal radiation from a nuclear burst at greater ranges than those at which the equipment would be damaged by EMP effects.
4. The information given in Tables D-1 and D-2 has been based on a simplification of the technical problems associated with EMP vulnerability assessments. They are included for information only and are not to be used for targeting analyses.

Table D-1. Equipment Vulnerability Categories

| <u>Equipment Categories</u> | <u>Probability of Damage</u> | <u>Equipment Included in Category</u> |
|-----------------------------|------------------------------|--|
| I | Very low | Artillery, tactical equipment (excluding commo equipment). |
| II | Low | Fire direction control equipment, nuclear warheads, missiles. |
| III | Medium | Long range communications equipment (greater than 100 km), air defense radars. |
| IV | High | Target acquisition radars, short range communications equipment (less than 100 km), command and control equipment. |

Table D-2. EMP Vulnerability for Surface/Low Air Bursts

| <u>Yield (KT)</u> | <u>Category III Equipment</u> | | <u>Category IV Equipment</u> | |
|-------------------|-------------------------------|------------------------------|------------------------------|------------------------------|
| | <u>Probable Safe Radii</u> | <u>Probable Damage Radii</u> | <u>Probable Safe Radii</u> | <u>Probable Damage Radii</u> |
| 1.0 | 1570m | * | 2270m | 1570m |
| 2.0 | 2070m | * | 4230m | 2070m |
| 3.0 | 2390m | * | 5150m | 2390m |
| 5.0 | 2630m | * | 5600m | 2630m |
| 10.0 | 3050m | * | 6300m | 3050m |
| 20.0 | 3060m | * | 6560m | 3060m |
| 50.0 | 3410m | * | 7610m | 3410m |
| 100.0 | 3890m | * | 8830m | 3890m |

*Radii would be determined by initial radiation, blast, or thermal radiation effects.



APPENDIX E
SIMPLIFIED REFERENCE DATA
CASUALTY AND DAMAGE RADII TABLE
(Distances in meters)

| Delivery System | Yield (KT) | EXPOSED PERSONNEL | | | PERSONNEL IN FOXHOLES | | | PERSONNEL IN TANKS | | | MODERATE DAMAGE TO MATERIEL | | |
|---------------------|------------|-------------------|-------------|----------|-----------------------|-------------|----------|--------------------|-------------|----------|-----------------------------|------------------|------------|
| | | Immed Perm | Immed Trans | Lat Leth | Immed Perm | Immed Trans | Lat Leth | Immed Perm | Immed Trans | Lat Leth | Medium Tanks | Wheeled Vehicles | Towed Arty |
| Short Range Cannon | 0.2 | 260 | 350 | 510 | 160 | 240 | 380 | 190 | 270 | 420 | 40 | 70 | 30 |
| Short Range Cannon | 1.0 | 460 | 580 | 800 | 310 | 420 | 610 | 360 | 470 | 660 | 90 | 170 | 60 |
| Medium Range Cannon | 2.0 | 630 | 790 | 1060 | 440 | 580 | 830 | 490 | 640 | 880 | 180 | 290 | 120 |
| Medium Range Cannon | 8.0 | 910 | 1130 | 1480 | 670 | 860 | 1170 | 730 | 920 | 1220 | 490 | 650 | 380 |
| Free Flight Rocket | 5.0 | 770 | 970 | 1310 | 520 | 700 | 1020 | 580 | 770 | 1070 | 190 | 360 | 110 |
| Free Flight Rocket | 20.0 | 930 | 1140 | 1490 | 660 | 850 | 1180 | 720 | 910 | 1220 | 560 | 820 | 420 |
| Guided Missile | 10.0 | 900 | 1110 | 1460 | 540 | 830 | 1150 | 700 | 890 | 1200 | 430 | 640 | 300 |
| Guided Missile | 50.0 | 1100 | 1320 | 1690 | 810 | 1010 | 1350 | 860 | 1060 | 1380 | 1060 | 1350 | 870 |
| Guided Missile | 100.0 | 1230 | 1440 | 1840 | 860 | 1090 | 1470 | 910 | 1130 | 1480 | 1440 | 1860 | 1140 |
| MARK 50 Bomb | 3.0 | 700 | 880 | 1180 | 470 | 640 | 920 | 540 | 700 | 970 | 150 | 290 | 90 |
| MARK 50 Bomb | 10.0 | 900 | 1110 | 1460 | 640 | 830 | 1150 | 700 | 890 | 1200 | 430 | 640 | 300 |
| MARK 50 Bomb | 100.0 | 1230 | 1440 | 1840 | 860 | 1090 | 1470 | 910 | 1130 | 1480 | 1440 | 1860 | 1140 |

1. Thermal effects are not considered in computing radii of damage or casualties.
2. Low air height of burst is used.
3. Radii are expected values based on 2/3 system range.

SAFETY RADII TABLE
(Distances in meters)

| Delivery System | YIELD (KT) | UNWARNED, EXPOSED PERSONNEL | | | WARNED, EXPOSED PERSONNEL | | | PROTECTED PERSONNEL | | | BUFFER DISTANCE |
|---------------------|------------|-----------------------------|-------|-------|---------------------------|-------|-------|---------------------|------|-------|-----------------|
| | | NEG | MOD | EMERG | NEG | MOD | EMERG | NEG | MOD | EMERG | |
| Short Range Cannon | 0.2 | 1040 | 950 | 710 | 850 | 810 | 710 | 730 | 650 | 550 | 150 |
| Short Range Cannon | 1.0 | 2390 | 2210 | 1280 | 1360 | 1230 | 1040 | 1480 | 1310 | 830 | 150 |
| Medium Range Cannon | 2.0 | 3770 | 3510 | 2160 | 2210 | 2020 | 1520 | 2150 | 1900 | 1110 | 200 |
| Medium Range Cannon | 8.0 | 7390 | 6820 | 4380 | 4280 | 3980 | 3140 | 3410 | 3010 | 1530 | 200 |
| Free Flight Rocket | 5.0 | 5870 | 5430 | 3530 | 3490 | 3230 | 2490 | 2980 | 2630 | 1380 | 800 |
| Free Flight Rocket | 20.0 | 10470 | 9550 | 5760 | 5440 | 5030 | 4020 | 4340 | 3830 | 1550 | 800 |
| Guided Missile | 10.0 | 7970 | 7310 | 4650 | 4510 | 4190 | 3330 | 3890 | 3440 | 1520 | 1000 |
| Guided Missile | 50.0 | 15920 | 14600 | 8740 | 7890 | 7230 | 5590 | 6020 | 5320 | 2180 | 1000 |
| Guided Missile | 100.0 | 21810 | 20160 | 12540 | 11040 | 10120 | 7530 | 8150 | 7210 | 2960 | 1000 |
| MARK 50 Bomb | 3.0 | 4630 | 4330 | 2730 | 2760 | 2530 | 1930 | 2630 | 2330 | 1240 | 500 |
| MARK 50 Bomb | 10.0 | 7970 | 7310 | 4650 | 4510 | 4190 | 3330 | 3890 | 3440 | 1520 | 500 |
| MARK 50 Bomb | 100.0 | 21810 | 20160 | 12540 | 11040 | 10120 | 7530 | 8150 | 7210 | 2960 | 500 |

1. Low air height of burst is used.
2. Buffer distances are 2.0 CEP or 3.5 PE larger at 2/3 system range, rounded up to nearest 50 meters. For the bomb, a CEP of 250 meters was assumed.
3. Safety yields were used for calculations.
4. Safety radii do not consider vertical dispersion.

COLLATERAL DAMAGE AVOIDANCE RADII TABLE

(Distances in meters)

| Delivery System | PERSONNEL INJURY | | | MODERATE DAMAGE TO FACILITIES | | | | | THERMAL IGNITION | | | |
|---------------------|------------------|-------|-------|-------------------------------|-------------------------|---------------------------|------------------------------|---------------|------------------|---------------|--------|---------------------|
| | Yield (KT) | Urban | Rural | In Open | Single-story Frame Bldg | Single-story Masonry Bldg | Lt. Steel Frame Indust. Bldg | Fixed Bridges | Rail-road Equip | Wood Shingles | Drapes | Newspapers & Debris |
| Short Range Cannon | 0.2 | 560 | 680 | 710 | 710 | 490 | 290 | 230 | 200 | 320 | 530 | 580 |
| Short Range Cannon | 1.0 | 850 | 1020 | 1280 | 1520 | 1020 | 630 | 520 | 460 | 760 | 1070 | 1140 |
| Medium Range Cannon | 2.0 | 1140 | 1480 | 2160 | 2160 | 1480 | 920 | 770 | 710 | 1220 | 1630 | 1720 |
| Medium Range Cannon | 8.0 | 1810 | 2430 | 4380 | 3310 | 2410 | 1530 | 1330 | 1390 | 2440 | 2910 | 2990 |
| Free Flight Rocket | 5.0 | 1570 | 2110 | 3530 | 2940 | 2090 | 1310 | 1120 | 1120 | 1960 | 2410 | 2500 |
| Free Flight Rocket | 20.0 | 2310 | 3100 | 5760 | 4200 | 3070 | 1990 | 1700 | 1870 | 3120 | 3470 | 3520 |
| Guided Missile | 10.0 | 2060 | 2770 | 4650 | 3760 | 2740 | 1730 | 1500 | 1520 | 2570 | 3020 | 3100 |
| Guided Missile | 50.0 | 3260 | 4340 | 8740 | 5860 | 4310 | 2960 | 2410 | 2810 | 4190 | 4440 | 4460 |
| Guided Missile | 100.0 | 4450 | 5910 | 12540 | 7950 | 5870 | 4190 | 3300 | 3940 | 5330 | 5460 | 5440 |
| MARK 50 Bomb | 3.0 | 1370 | 1840 | 2730 | 2640 | 1840 | 1140 | 960 | 880 | 1530 | 1970 | 2060 |
| MARK 50 Bomb | 10.0 | 2060 | 2770 | 4650 | 3760 | 2740 | 1730 | 1500 | 1520 | 2570 | 3020 | 3100 |
| MARK 50 Bomb | 100.0 | 4450 | 5910 | 12540 | 7950 | 5870 | 4190 | 3300 | 3940 | 5330 | 5460 | 5440 |

1. Low air height of burst is used.
2. Safety yields were used for calculations.
3. Collateral damage avoidance radii do not consider vertical dispersion or horizontal buffer distances.

NOTE: Personnel injury normally governs collateral damage constraints

INDEX

| | <u>PARAGRAPH</u> | <u>PAGE</u> |
|------------------------------------|-----------------------------|---------------------------|
| Accuracy | | |
| Cannon, Medium Range | 2-2 | 2-2 |
| Cannon, Short Range | 2-1 | 2-2 |
| Free Flight Rocket | 2-3 | 2-3 |
| Guided Missile | 2-4 | 2-4 |
| MARK 50 Bomb | 2-5 | 2-5 |
| Aircraft Damage | 1-5, Table 12-13 | 1-3, 12-11 |
| Atomic Demolition Munitions (ADM) | 1-7, Chapter 12 | 1-3, 12-1 to 12-12 |
| Blackout | Appendix C | C-1 |
| Blast Casualty and Damage | 1-2, Table 12-13 | 1-1, 12-11 |
| Blowdown | 1-5, Table 12-13 | 1-3, 12-11 |
| Bomb | 2-5 | 2-5 |
| Bridge Damage | | |
| ADM | 1-7 | 1-4, 12-7 |
| Low Air Burst | 1-5 | 1-3 |
| Buffer Distance | 1-5 | 1-2 |
| Building Damage | | |
| Light | 1-2, 1-5 | 1-1, 1-3 |
| Moderate | 1-2 | 1-1 |
| Severe | 1-2 | 1-1 |
| Burns | 1-8 | 1-4 |
| Cannon, Medium Range | 2-2 | 2-2 |
| Cannon, Short Range | 2-1 | 2-2 |
| Casualty Assessment | 1-2 | 1-1 |
| Casualty Yield | 1-2 | 1-1 |
| Characteristics of Weapons | | |
| ADM | Table 12-1 | 12-2 |
| Cannon, Medium Range | 2-2 | 2-2 |
| Cannon, Short Range | 2-1 | 2-2 |
| Free Flight Rocket | 2-3 | 2-3 |
| Guided Missile | 2-4 | 2-4 |
| MARK 50 Bomb | 2-5 | 2-5 |
| Collateral Damage | 1-9, Chapter 14 | 1-4, 14-1 to 14-8 |
| Comparable Target Table | Figure 15-5 | 15-6 |
| Coverage Tables | 1-5, Chapter 4-11 | 1-2, 4-1 to 11-14 |
| Crater Dimensions | | |
| ADM | Table 12-7 | 12-8 |
| Surface Burst | 1-6 | 1-3 |
| Crater Obstacles | | |
| ADM | 1-7, Table 12-7 | 1-4, 12-8 |
| Surface Burst | 1-6 | 1-3 |
| Crater Sketch | | 12-3 |
| Damage Assessment | 1-2 | 1-1 |
| Damage Definitions | 1-2 | 1-1 |
| Damage to Structures | | |
| Light | 1-2, 1-5 | 1-1, 1-3 |
| Moderate | 1-2 | 1-1 |
| Severe | 1-2 | 1-1 |
| Dose Distance Data | 1-7, Table 12-12 | 1-4, 12-11 |
| Dual Fuzing | 2-3, Appendix B | 2-2, B-1 to B-6 |
| Earth Shelters | 1-8, Table 12-4 | 1-4, 12-4 |
| Effects Tables | 1-8, Chapter 13 | 1-4, 13-1 to 13-22 |
| EMP | Appendix D | D-1 |
| Employment Considerations | | |
| ADM | Table 12-1 | 12-2 |
| Cannon, Medium Range | 2-2 | 2-2 |
| Cannon, Short Range | 2-1 | 2-2 |
| Free Flight Rocket | 2-3 | 2-3 |
| Guided Missile | 2-4 | 2-4 |
| MARK 50 Bomb | 2-5 | 2-5 |
| Expected Radius of Damage/Coverage | 1-5 | 1-2 |
| Exposed Personnel | 1-2 | 1-2 |
| Factories | 1-8 | 1-4 |
| Fallout Safe | 1-5, 2-1 to 2-3, Appendix B | 1-2, 2-2, 2-3, B-1 to B-6 |
| Fires | | |
| ADM | 1-7, Table 12-11 | 1-4, 12-10 |
| Low Airburst | 1-5 | 1-2 |
| Foxholes | 1-2, Table 12-4 | 1-2, 12-4 |
| Free Flight Rocket | 2-3, Appendix B | 2-3, B-1 to B-6 |
| Fuzing | | |
| Cannon, Medium Range | 2-2 | 2-2 |
| Cannon, Short Range | 2-1 | 2-1 |
| Free Flight Rocket | 2-3, Appendix B | 2-3 |
| Guided Missile | 2-4 | 2-4 |
| MARK 50 Bomb | 2-5 | 2-5 |

| | <u>PARAGRAPH</u> | <u>PAGE</u> |
|--|---------------------------------|-----------------------------|
| Graphs | | |
| Expected Coverage----- | Figure 15-1 | 15-2 |
| High Assurance----- | Figure 15-2 | 15-3 |
| Point Target----- | Figure 15-3 | 15-4 |
| Guided Missile----- | 2-4 | 2-4 |
| Height of Burst | | |
| Brackets----- | 1-8, 1-9 | 1-4 |
| Fallout Safe----- | 1-5, 2-1 to 2-3, Appendix B | 1-2, 2-2, 2-3 B-1 to B-6 |
| Helicopter Damage----- | 1-5, Table 12-5, Table 12-13 | 1-3, 12-5, 12-11 |
| High Assurance----- | 1-5 | 1-2 |
| Incapacitation | | |
| Immediate Permanent (IP)----- | 1-2 | 1-1 |
| Immediate Transient (IT)----- | 1-2 | 1-1 |
| Latent Lethality (LL)----- | 1-2 | 1-1 |
| Landmine Detonation----- | Table 12-13 | 12-11 |
| Landslide Obstacles----- | | 12-7 |
| Latent Lethality----- | 1-2 | 1-1 |
| Least Separation Distance (LSD)----- | 1-5 | 1-3 |
| Light Aircraft in Flight | | |
| ADM----- | Table 12-13 | 12-11 |
| Low Airburst----- | 1-5 | 1-2 |
| Light Damage----- | 1-2 | 1-1 |
| MARK 50 Bomb----- | 2-5 | 2-5 |
| Minimum Radius of Damage----- | 1-5 | 1-2 |
| Minimum Safe Distance (MSD)----- | 1-5 | 1-2 |
| Moderate Damage----- | 1-2, 1-8, 1-9 | 1-1, 1-4, 1-5 |
| Moderate Risk----- | 1-5 | 1-2 |
| Negligible Risk----- | 1-5 | 1-2 |
| Nuclear Radiation Safety----- | 1-5, 1-7 | 1-2, 1-4 |
| Obstacles | | |
| ADM----- | 1-7 | 1-4 |
| Surface Burst----- | 1-6 | 1-3 |
| Overpressure----- | Table 12-8 | 12-9 |
| Personnel Protection | | |
| Exposed (In Open)----- | 1-2 | 1-2 |
| Foxholes----- | 1-2 | 1-2 |
| Tanks----- | 1-2 | 1-2 |
| Personnel Radiation Casualty Criteria----- | 1-2 | 1-1 |
| Piers, Damage----- | 1-7 | 1-4 |
| Point Target----- | Figure 15-3 | 15-4 |
| Preclusion of Damage/Casualty----- | 1-5 | 1-2, 1-3 |
| Preinitiation----- | Chapter 3 | 3-1 |
| Probable Minimum Radius of Damage----- | 1-5 | 1-2 |
| Protected Personnel----- | 1-8 | 1-4 |
| Radii of Damage | | |
| Expected----- | 1-5 | 1-2 |
| High Assurance----- | 1-5 | 1-2 |
| Probable Minimum----- | 1-5 | 1-2 |
| Radii of Vulnerability | | |
| Railroad Facilities----- | Figure 15-4 | 15-5 |
| Reaction Times----- | 1-8, Table 12-5 | 1-4, 12-5 |
| ADM----- | 12-4 | 12-2 |
| Cannon, Medium Range----- | 2-2 | 2-2 |
| Cannon, Short Range----- | 2-2 | 2-2 |
| Free Flight Rocket----- | 2-3 | 2-3 |
| Guided Missile----- | 2-4 | 2-4 |
| MARK 50 Bomb----- | 2-5 | 2-5 |
| Residual Radiation----- | Figure 15-6 | 15-7 |
| Risk Criteria | | |
| Emergency----- | 1-5 | 1-2 |
| Moderate----- | 1-5 | 1-2 |
| Negligible----- | 1-5 | 1-2 |
| Rupture Zone----- | | 12-3 |
| Safe Separation Distance----- | Table 12-9 | 12-9 |
| Safety Distance Assessment----- | 1-2 | 1-2 |
| Safety Distance Tables----- | 1-5 | 1-2 |
| Safety Radii | | |
| ADM----- | 1-7, Table 12-10 | 1-4, 12-9 |
| Low Airburst----- | 1-5 | 1-2 |
| Safety Yield----- | 1-2 | 1-1 |
| Self-Propelled Artillery----- | 1-2 | 1-2 |
| Severe Damage----- | 1-2, 1-8 | 1-1, 1-4 |
| Simplified Reference Data----- | Appendix E | E-1 |
| Supply Depots----- | 1-8, Table 12-5 | 1-4, 12-5 |

| | <u>PARAGRAPH</u> | <u>PAGE</u> |
|--|------------------|--------------------|
| Surface Burst----- | 1-6 | 1-3 |
| Tamping----- | 1-7 | 1-3 |
| Tanks, Moderate Damage----- | 1-2 | 1-2 |
| Transmission Factors----- | Figure 15-6 | 15-7 |
| Tree Blowdown----- | 1-5 | 1-3 |
| Tunnels, Damage----- | 1-7, Table 12-6 | 1-3, 12-6 |
| Vertical Bracket----- | 1-8, 1-9 | 1-4 |
| Very High Assurance----- | 1-5 | 1-2 |
| Vulnerability, EMP----- | Appendix D | D-1 |
| Weapons Effects Tables----- | 1-8, Chapter 13 | 1-4, 13-1 to 13-22 |
| Wheeled Vehicles, Moderate Damage----- | 1-2 | 1-2 |
| Yields----- | 1-2, 2-1 to 2-5 | 1-1, 2-1 to 2-5 |

*U.S. GOVERNMENT PRINTING OFFICE: 1977 238-607 1-3

I N D E X

| | |
|------------|---|
| CHAPTER 1 | CONTENTS, DATA SOURCES AND APPLICATIONS |
| CHAPTER 2 | WEAPONS SYSTEMS CHARACTERISTICS |
| CHAPTER 3 | PREINITIATION |
| CHAPTER 4 | COVERAGE AND SAFETY TABLES LOW AIR BURST EXPOSED PERSONNEL |
| CHAPTER 5 | COVERAGE AND SAFETY TABLES LOW AIR BURST - PERSONNEL IN OPEN FOXHOLES |
| CHAPTER 6 | COVERAGE AND SAFETY TABLES LOW AIR BURST - PERSONNEL IN TANKS |
| CHAPTER 7 | COVERAGE AND SAFETY TABLES LOW AIR BURST - MODERATE DAMAGE TO MATERIEL |
| CHAPTER 8 | COVERAGE AND SAFETY TABLES SURFACE/NEAR SURFACE BURST - EXPOSED PERSONNEL |
| CHAPTER 9 | COVERAGE AND SAFETY TABLES SURFACE/NEAR SURFACE BURST - PERSONNEL IN OPEN FOXHOLES |
| CHAPTER 10 | COVERAGE AND SAFETY TABLES SURFACE/NEAR SURFACE BURST - PERSONNEL IN TANKS |
| CHAPTER 11 | COVERAGE AND SAFETY TABLES SURFACE/NEAR SURFACE BURST - MODERATE DAMAGE TO MATERIEL |
| CHAPTER 12 | ATOMIC DEMOLITION MUNITIONS |
| CHAPTER 13 | WEAPONS EFFECTS TABLES |
| CHAPTER 14 | COLLATERAL DAMAGE AVOIDANCE TABLES |
| CHAPTER 15 | GRAPHS AND TABLES |
| APPENDIX A | REFERENCES |
| APPENDIX B | DUAL FUZING CONSIDERATIONS |
| APPENDIX C | BLACKOUT EFFECTS OF NUCLEAR DETONATIONS ON RADIO COMMUNICATIONS AND RADAR TRANSMISSION/RECEPTION |
| APPENDIX D | VULNERABILITY OF ARMY TACTICAL EQUIPMENT TO EMP |
| APPENDIX E | SIMPLIFIED REFERENCE DATA |

